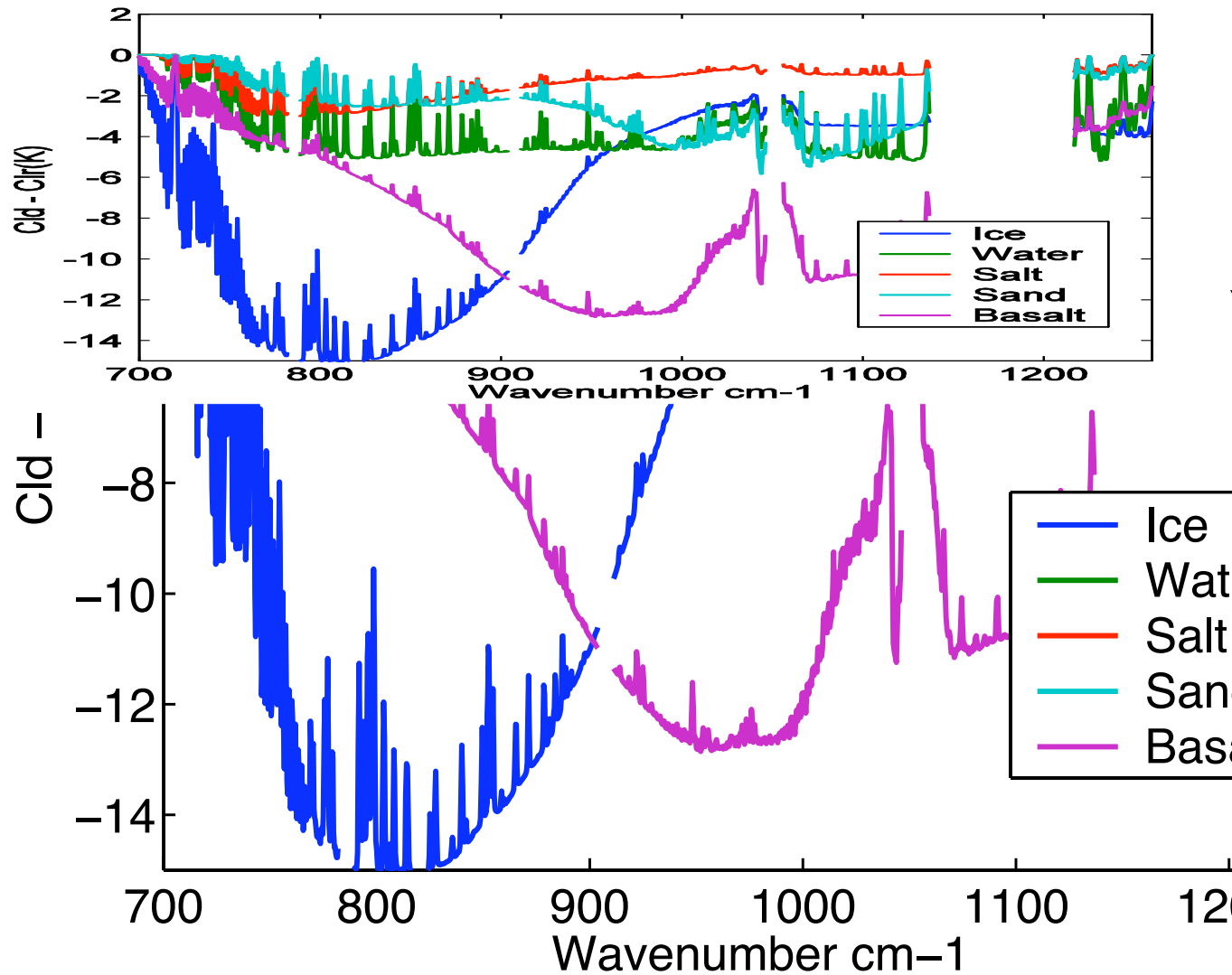




## Silicate Dust retrieval from AIRS

- Dust over oceans easily observed with wide geographic range
- Our results, for monthly means, use our database of clear FOVs, which means the dust contamination was very uniform (within 0.3K) within a golfball. **Dust contamination will survive cloud clearing.**
- In addition, dust forcing greater than 4K is rejected in our clear detection scheme.
- Silicate index of refraction allows discrimination between dust and cirrus within the 10-12 micron window
- We are beginning to retrieve aerosol optical depth and particle size from the AIRS spectra.
- Volcanic eruptions will also contaminate AIRS retrievals, and provide opportunities for testing our aerosol retrievals.
- Dust retrievals need vertical profile information, can be derived from AIRS spectra directly?

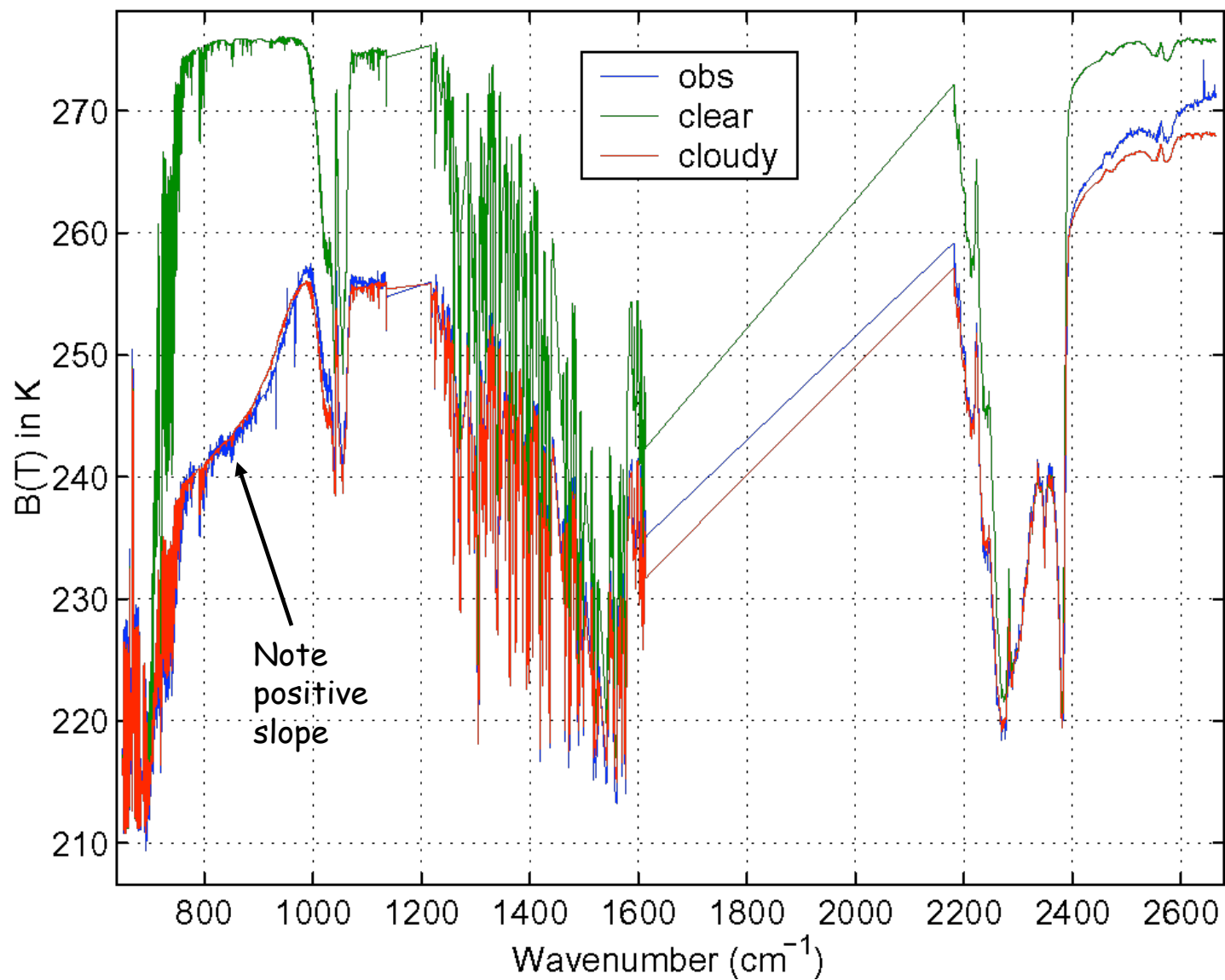
# Nominal Effects of Various Aerosols on AIRS B(T)'s Separation of Cirrus from Silicates Possible



Note low  
impact past  
1200  $cm^{-1}$

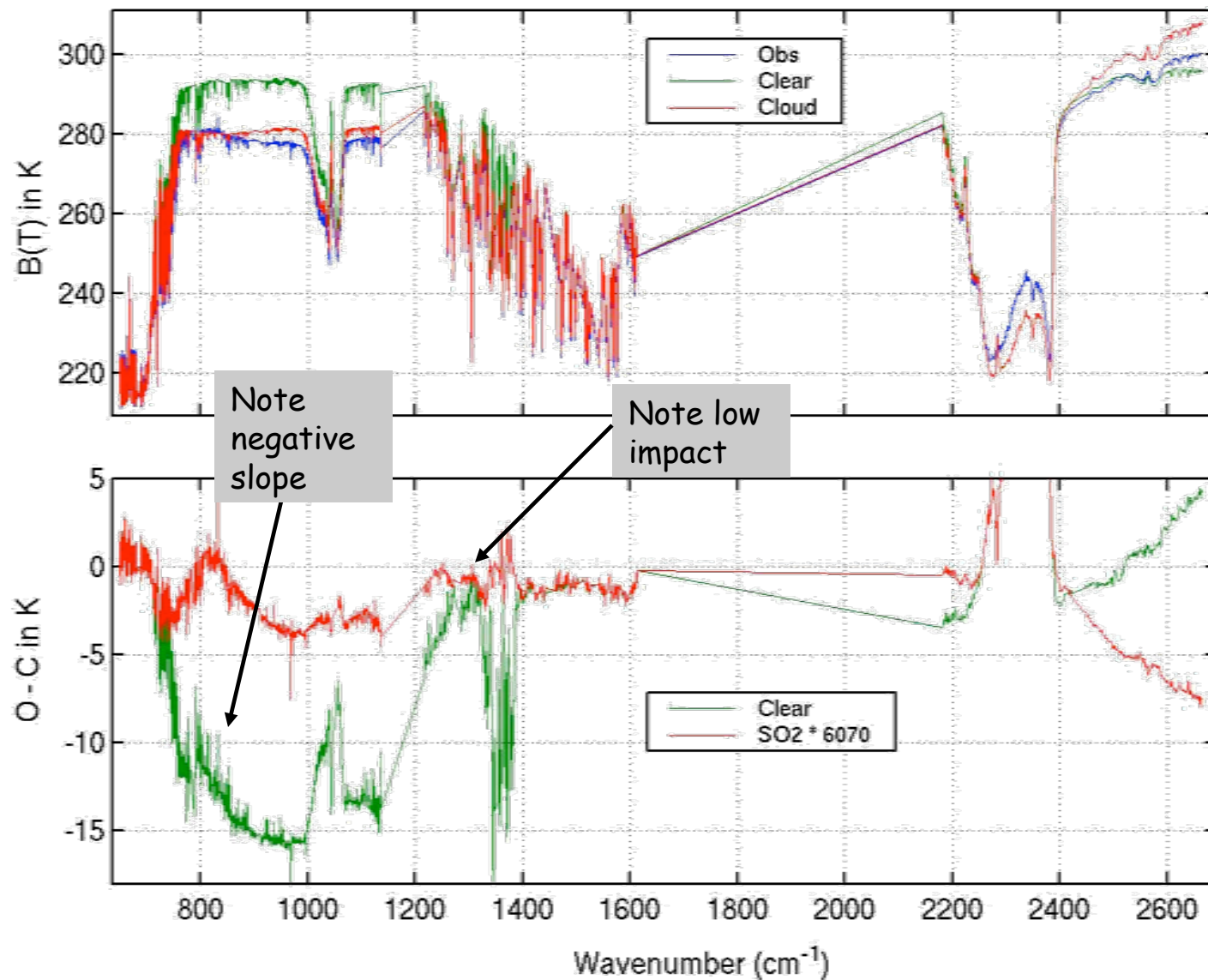
# Cirrus Retrievals: SARTA-Scattering RTA

granule = 56 day = -1 iwp,dme = 7.5 20

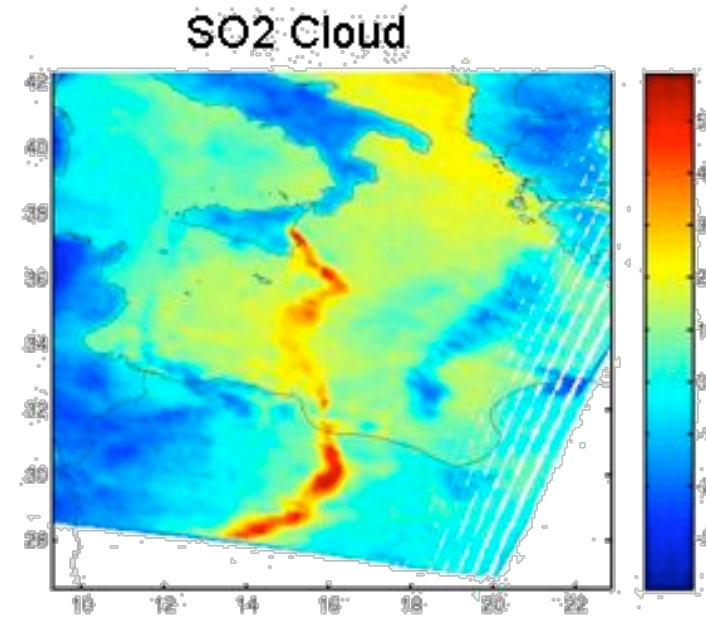
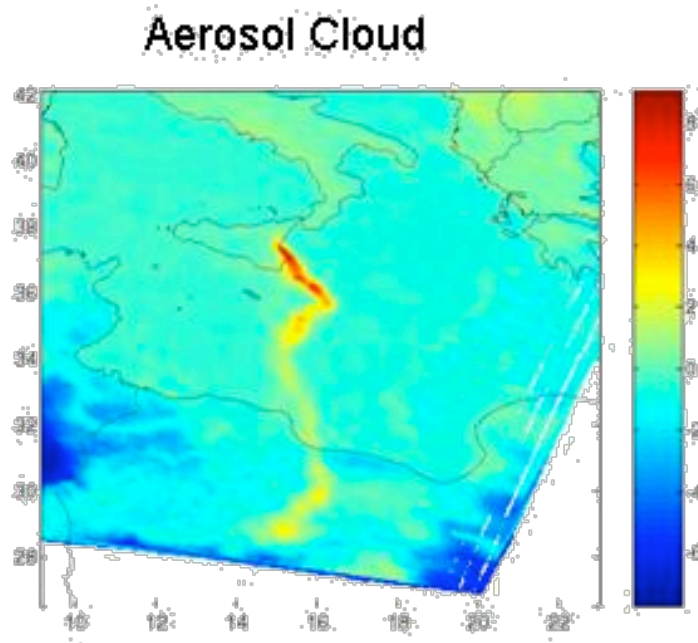


# Volcanic Aerosols: Note negative slope

Oct 28, 2002; Granule 123; Profile 2224

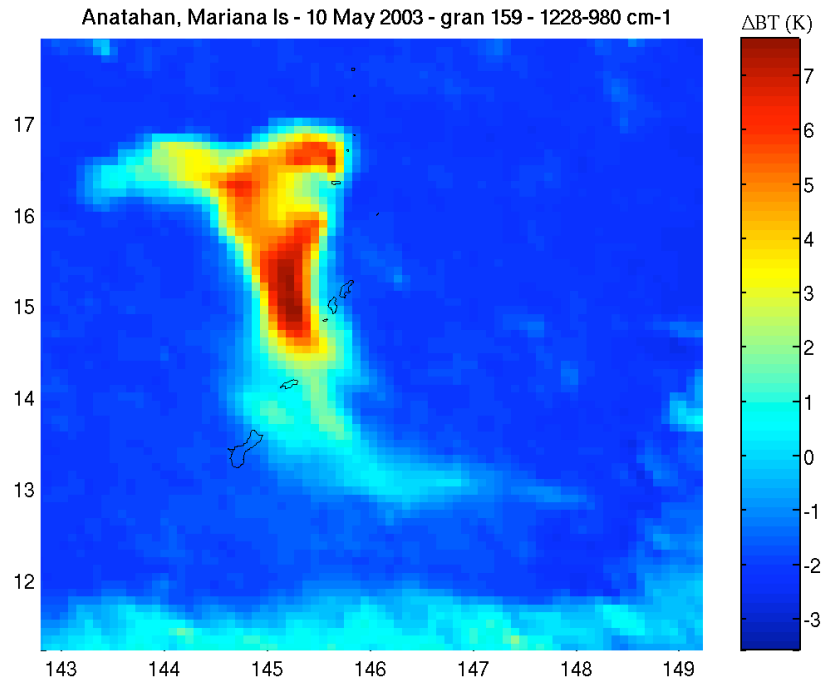


# Mt. Etna SO<sub>2</sub> Cloud and Ash Plume from B(T) BIAS Differences

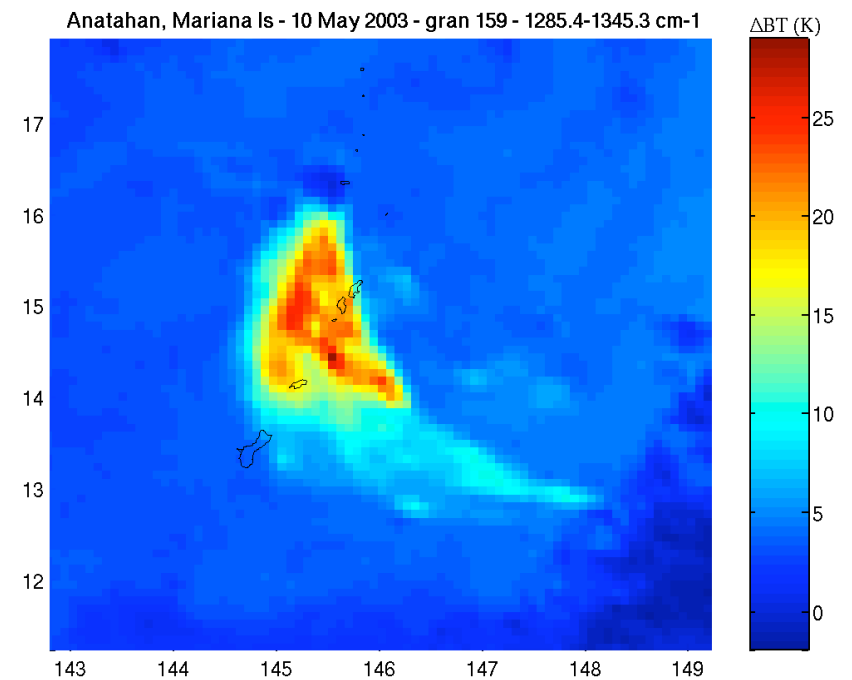


# Anatahan Eruption: Differential Movement of Ash vs SO<sub>2</sub> Cloud

Ash cloud

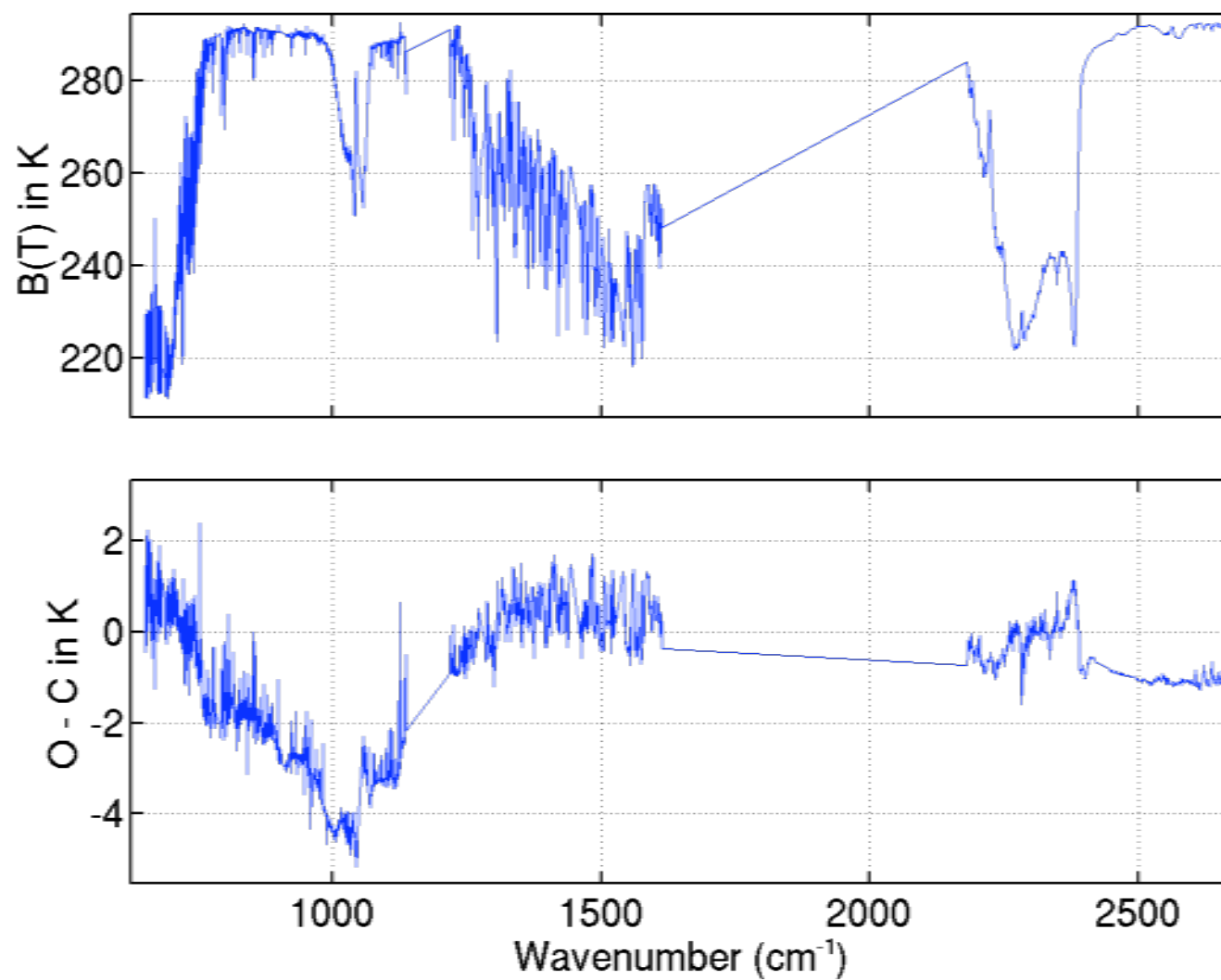


SO<sub>2</sub> cloud



# Sahara Dust Spectrum: From "clear" database

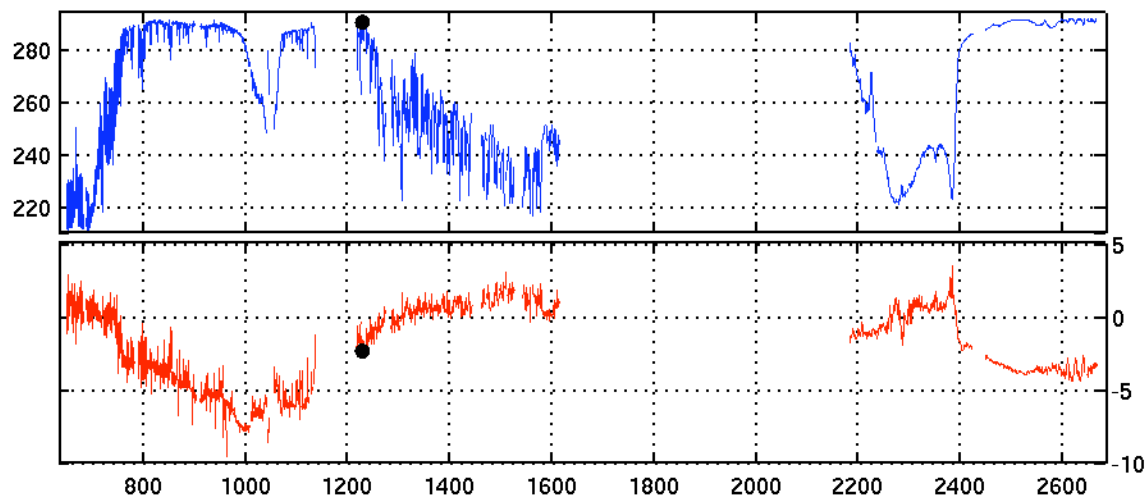
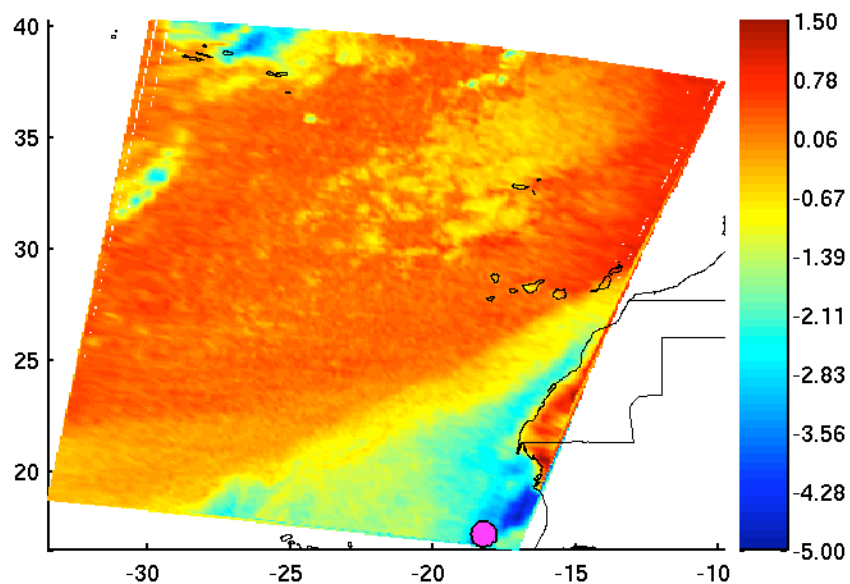
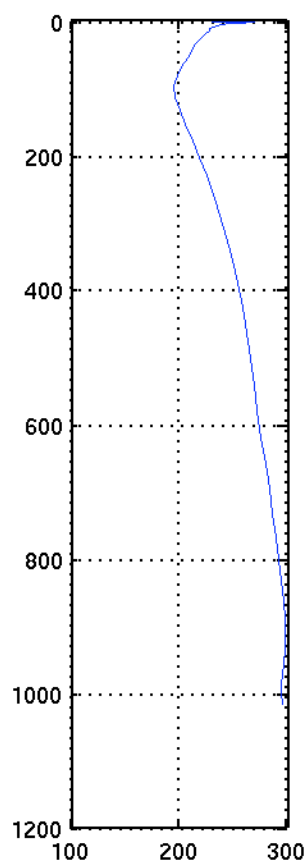
July 7, 2003 Dust; Lat = 18, Lon = -20



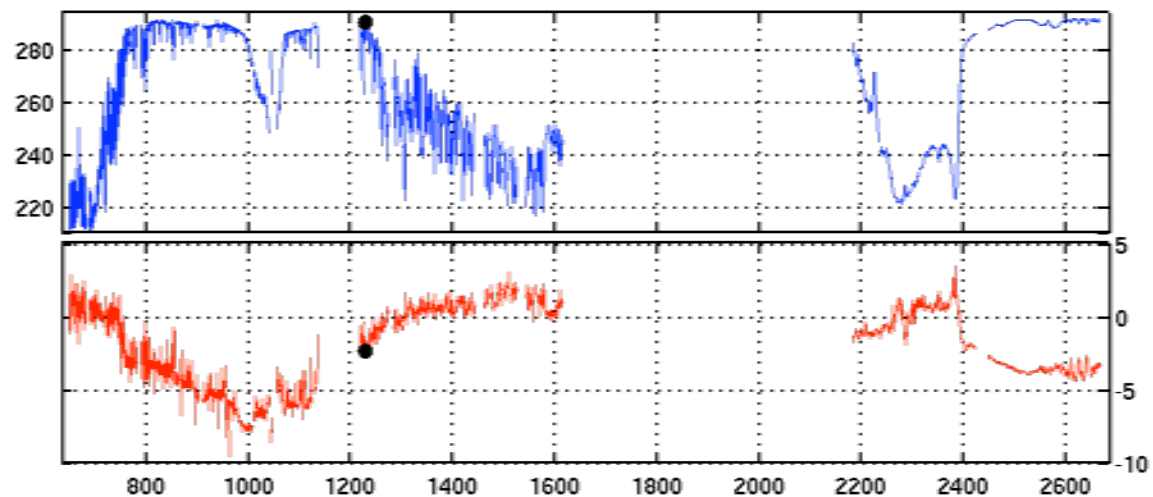
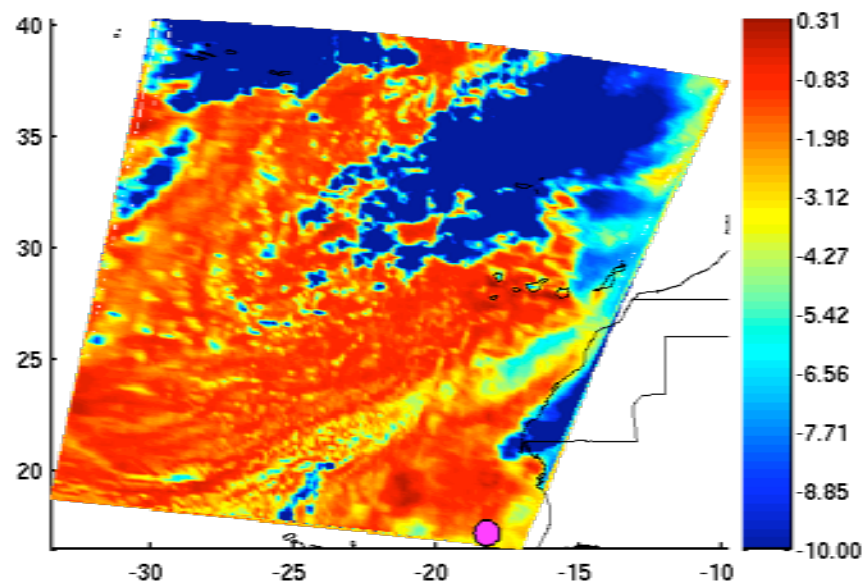
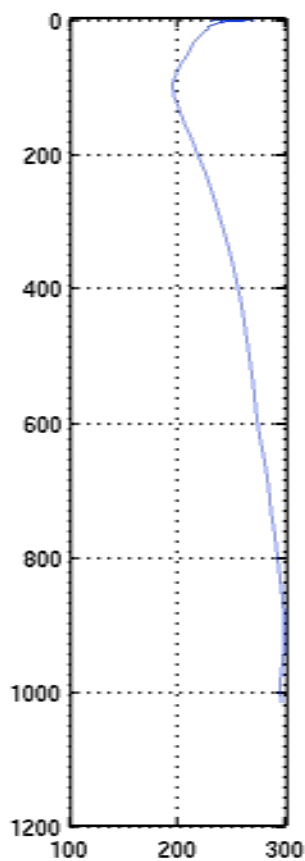


# Sahara Dust Image 961 - 1232 cm<sup>-1</sup>

X	
Y	

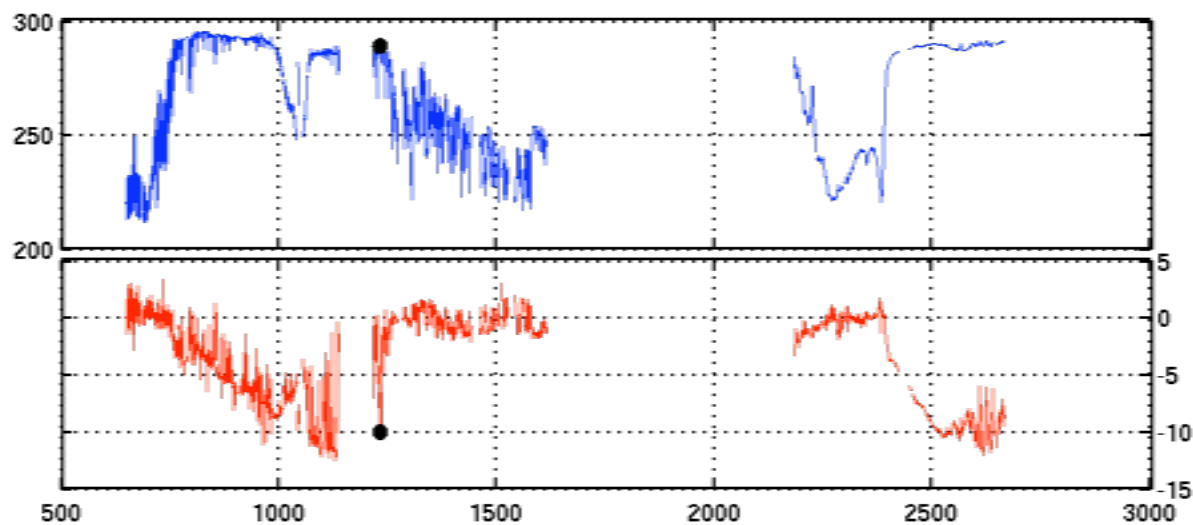
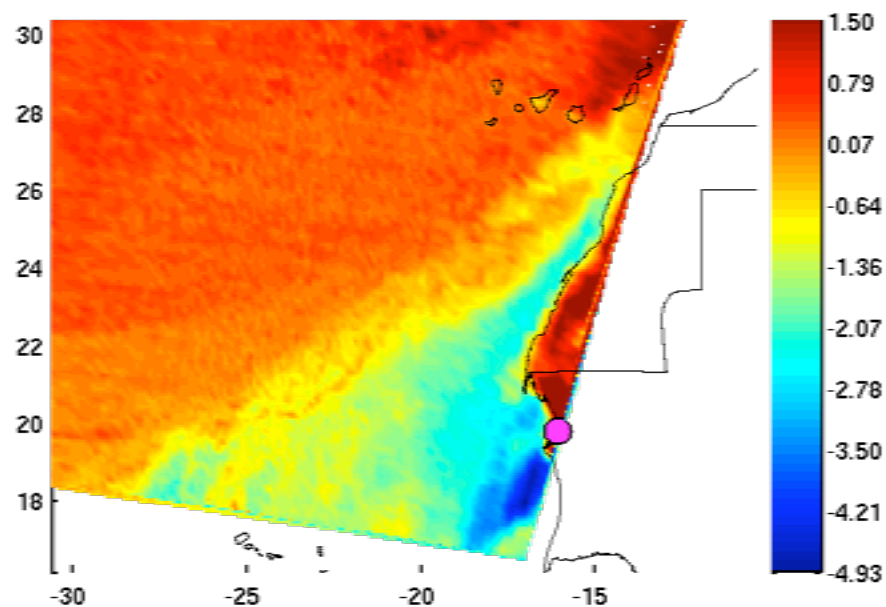
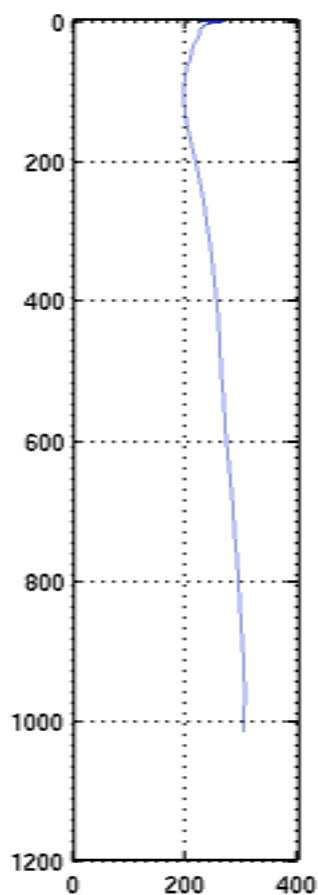


X	
Y	1864C4



# Dust Observations over Land

X	-27.7445
Y	16.8247

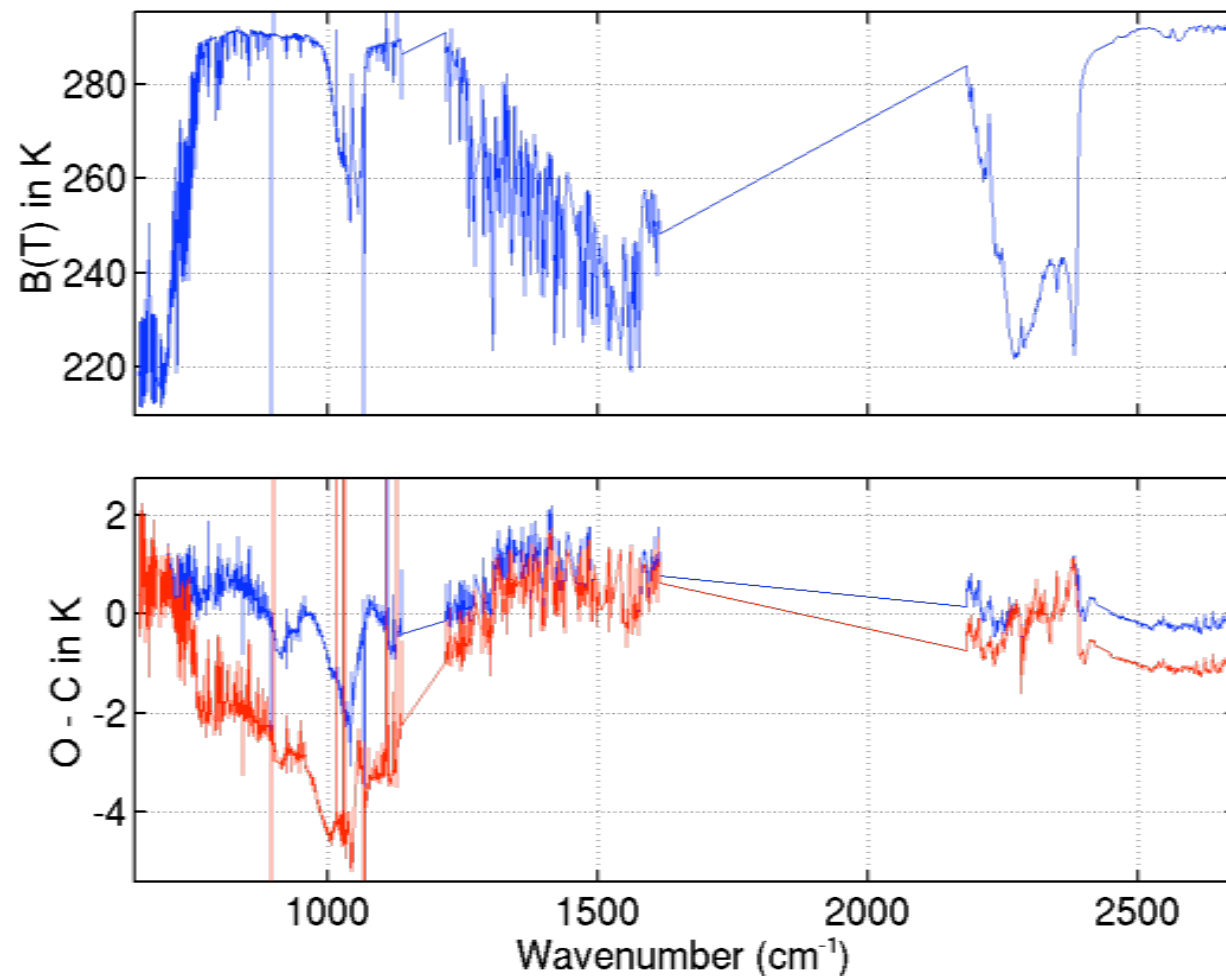


# Fit to West African Dust Spectrum for Particle Size and Optical Depth

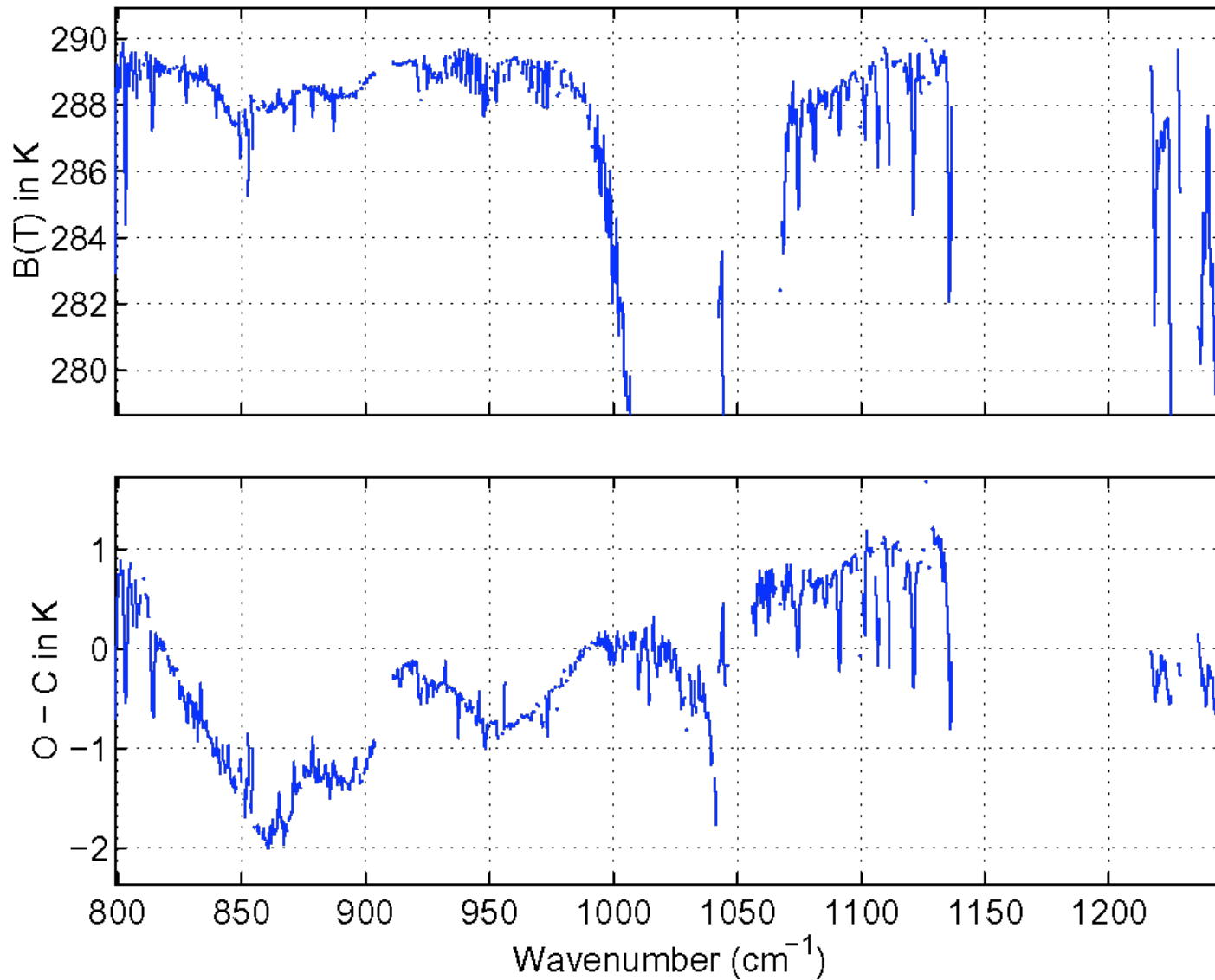
- Cyprus = 3.7 micron dia
- Gobi = 3.9 micron dia
- Carribean = 3.1 micron dia
- West Africa = 4.5 micron dia

Blue = Fitted O-C

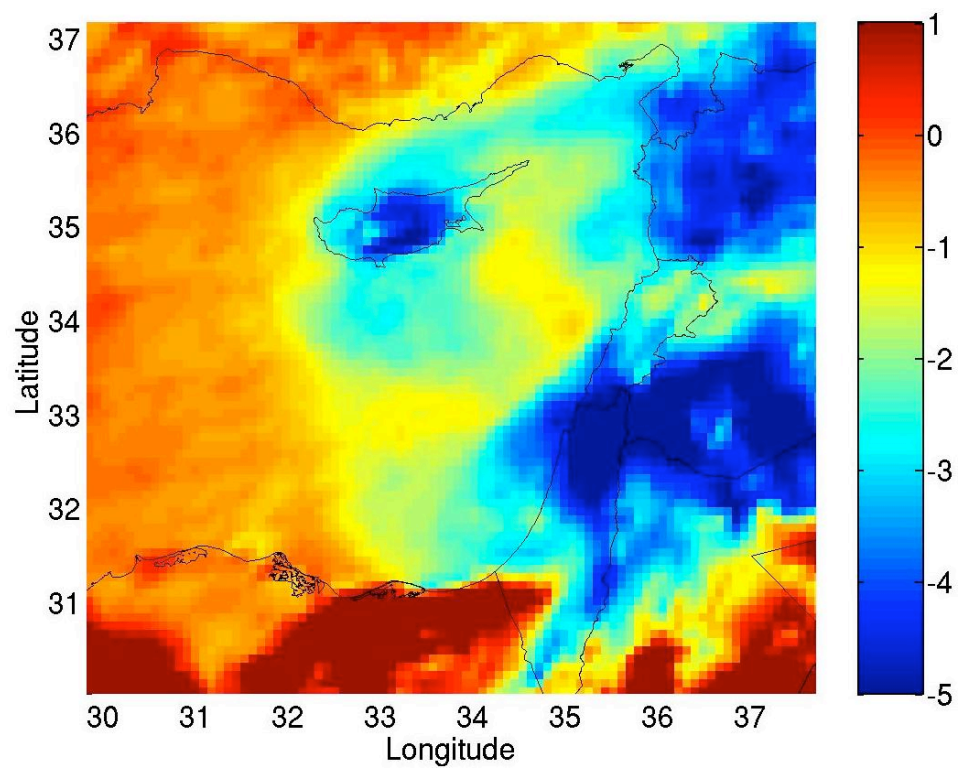
Red = Clear sky O-C



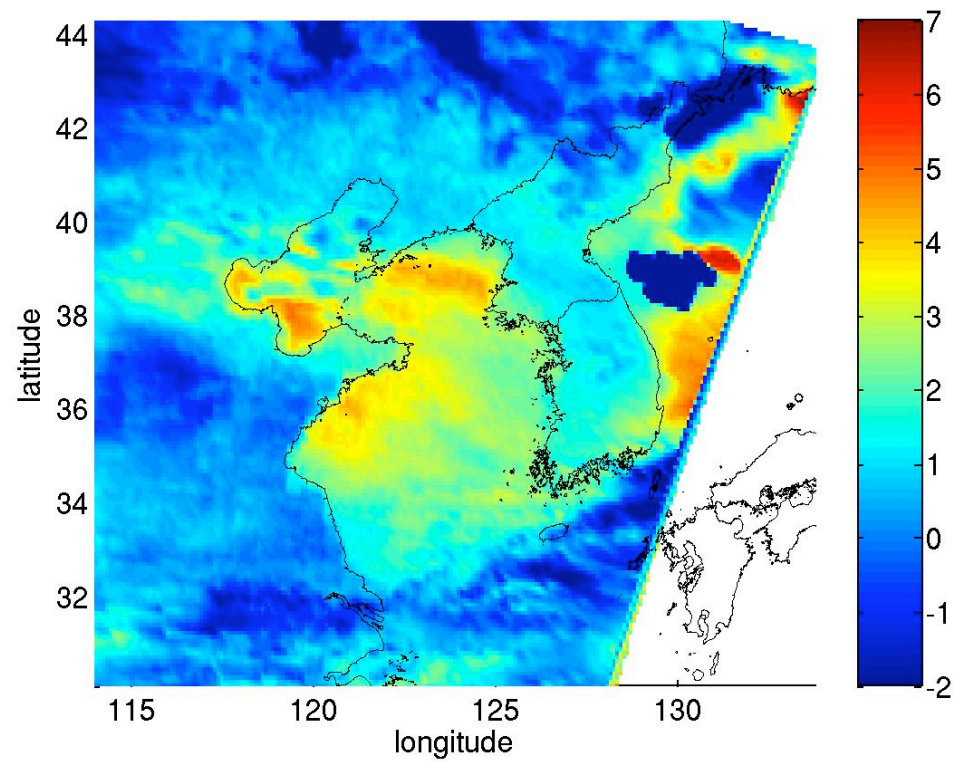
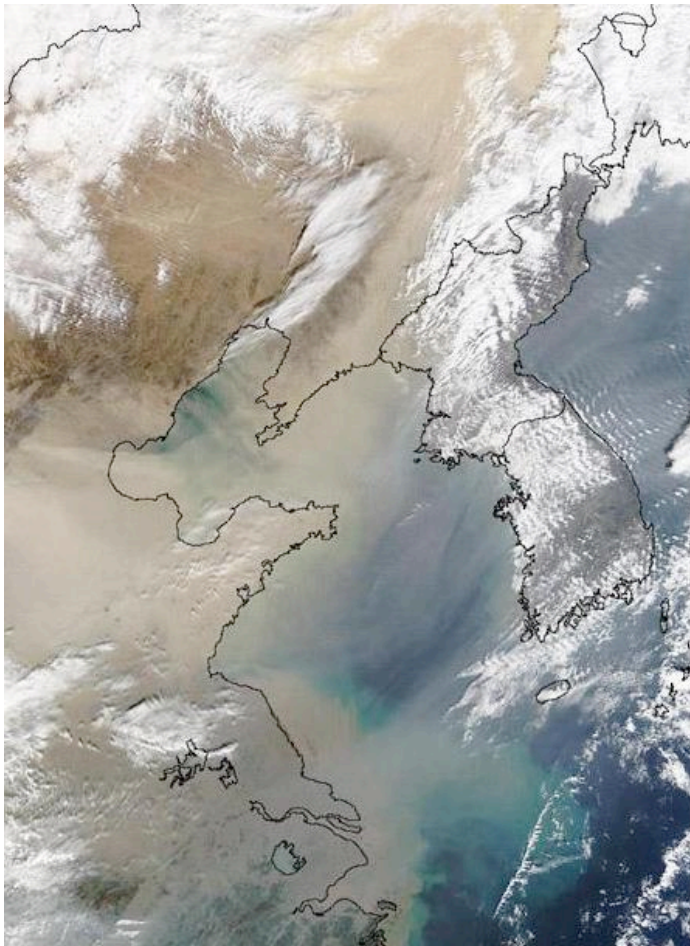
Dust going from absorption to emission across window region:  
Large Sahel inversion. AIRS useful for direct IR forcing of dust?



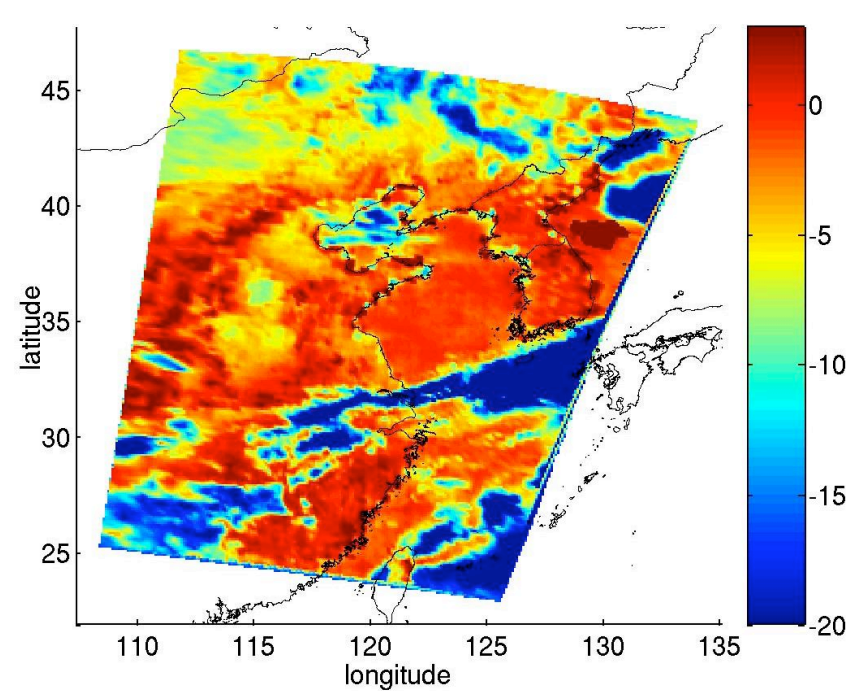
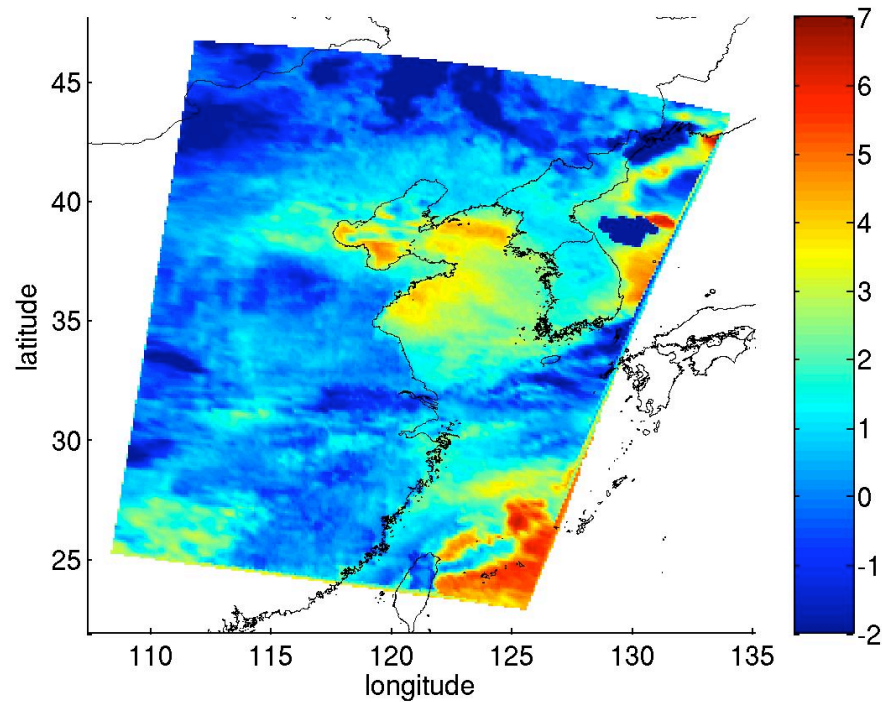
# MODIS vs AIRS Observation of Eastern Mediterranean Dust Storm



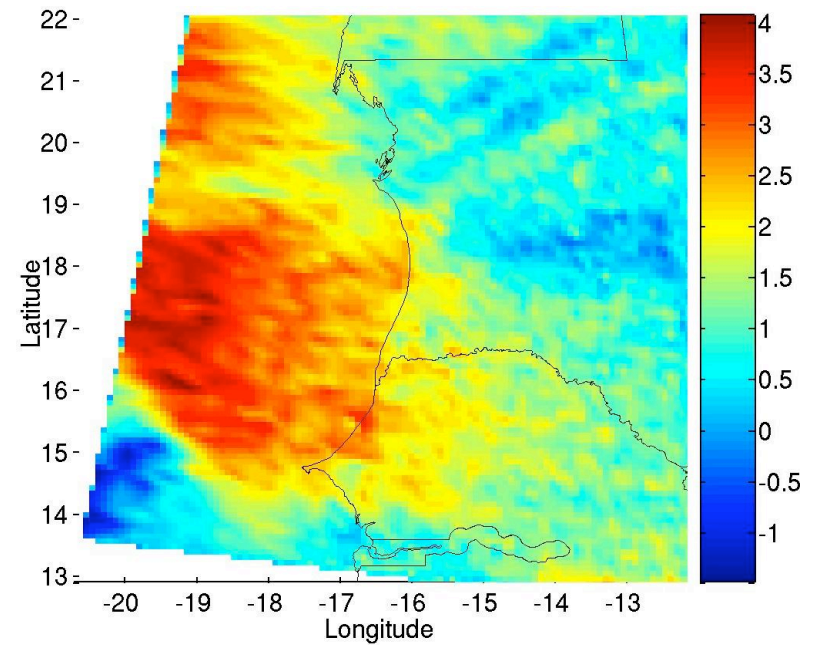
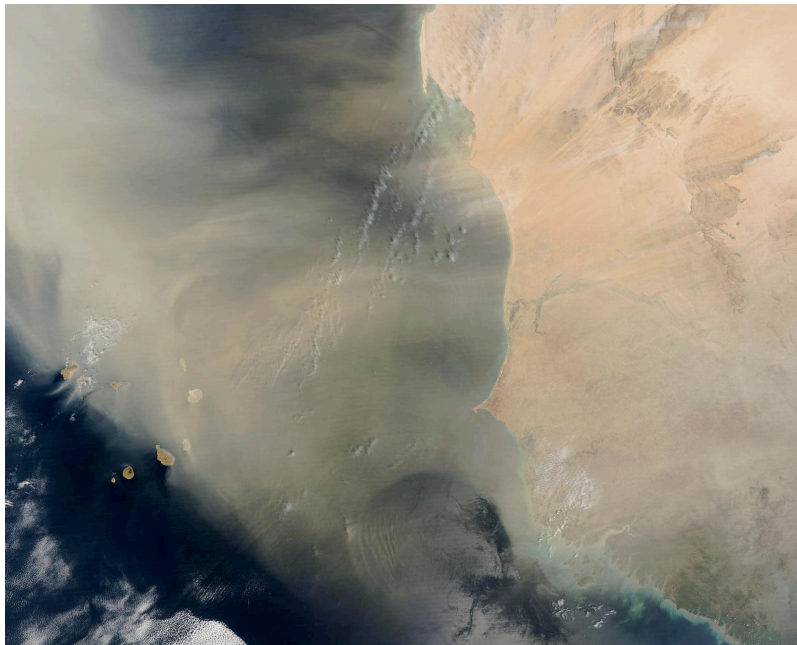
# MODIS vs AIRS Observation of Gobi Dust Storm



Use surface channel to see clouds

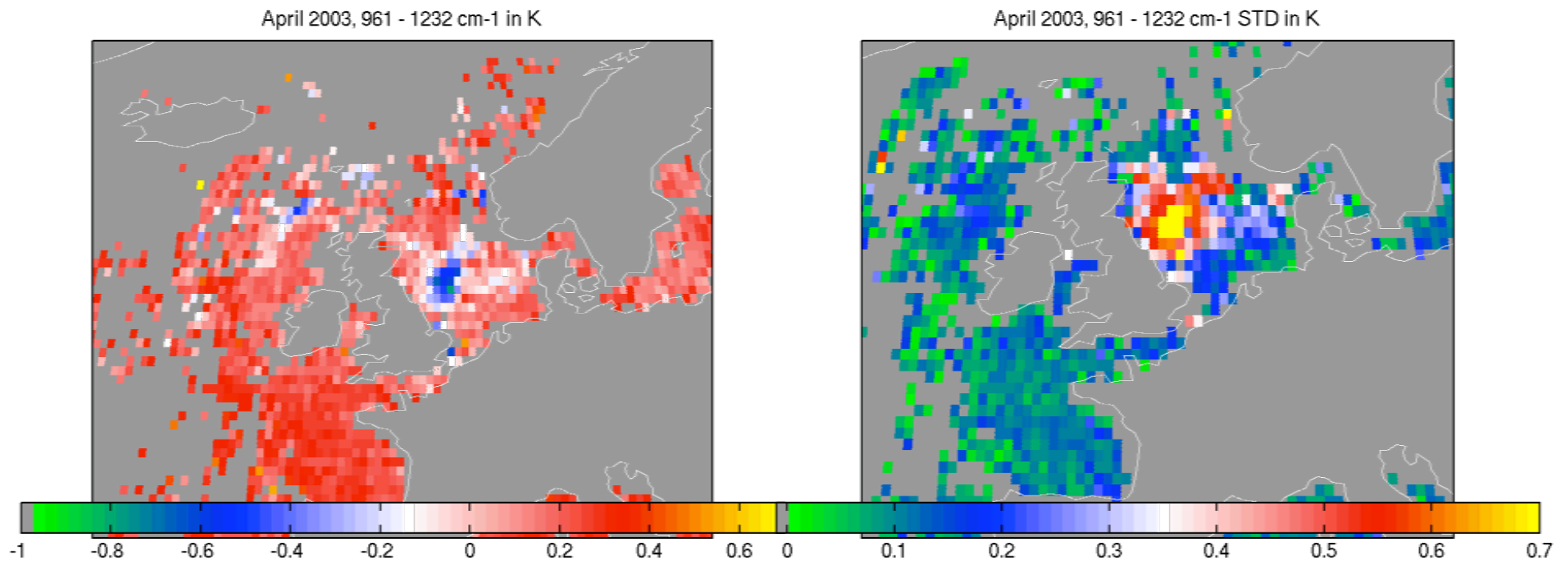


# MODIS vs AIRS Observation of Saharan Dust Storm

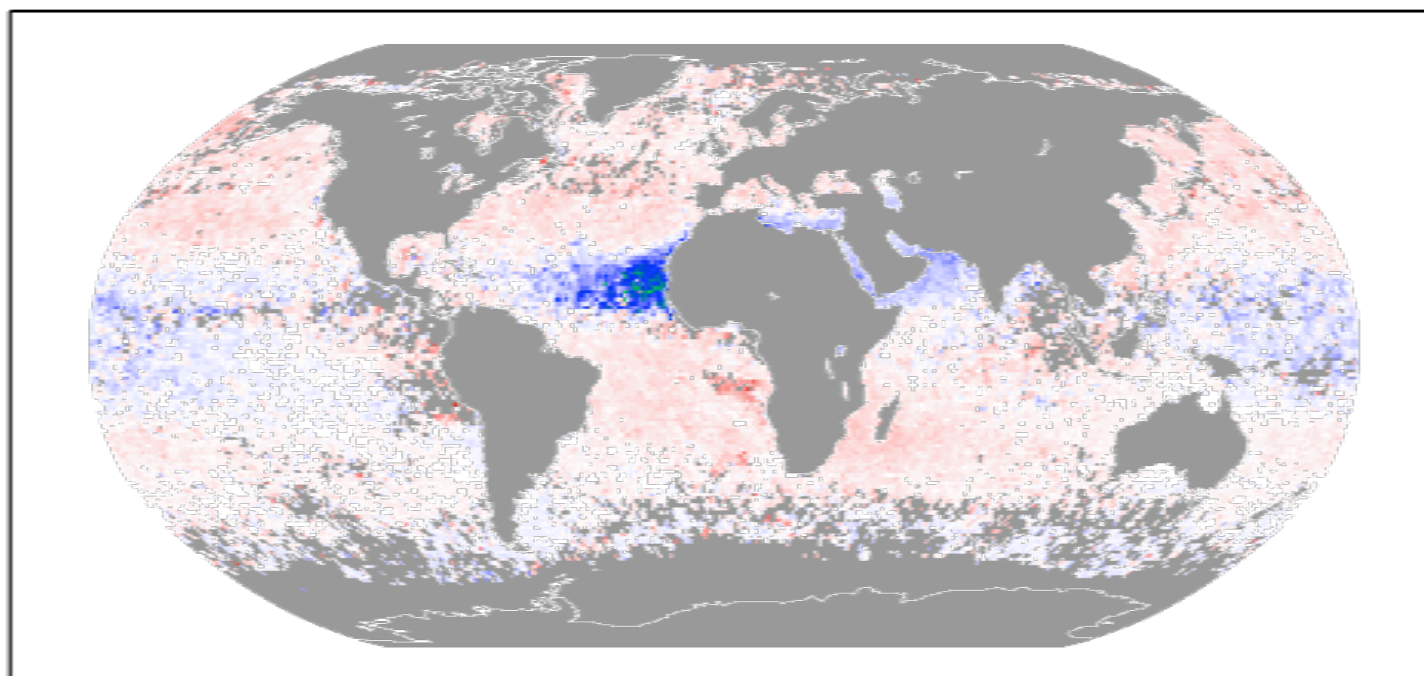


# Dust Storm Reaching the North Sea

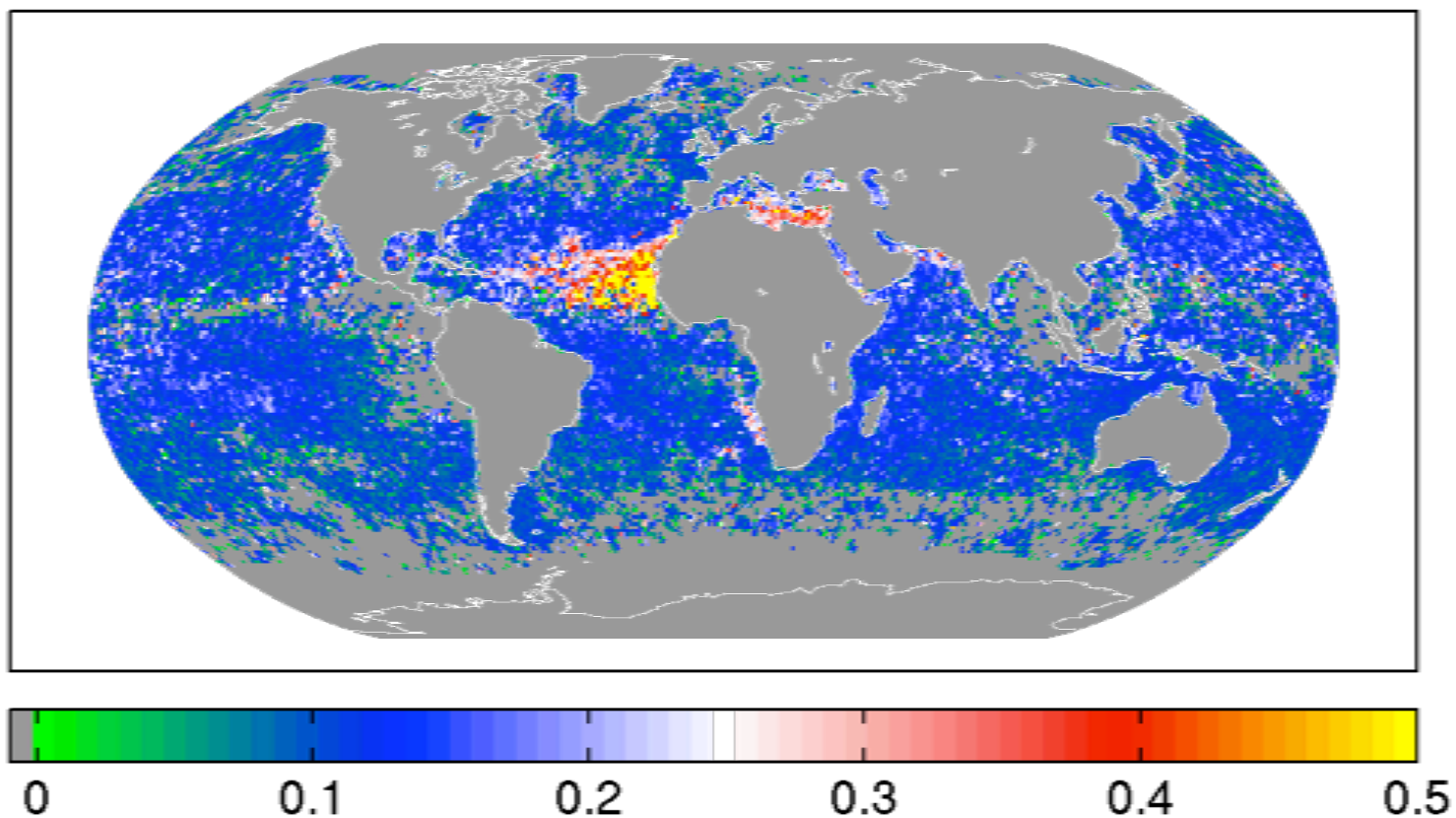
NOTE: This is a **monthly** statistic!



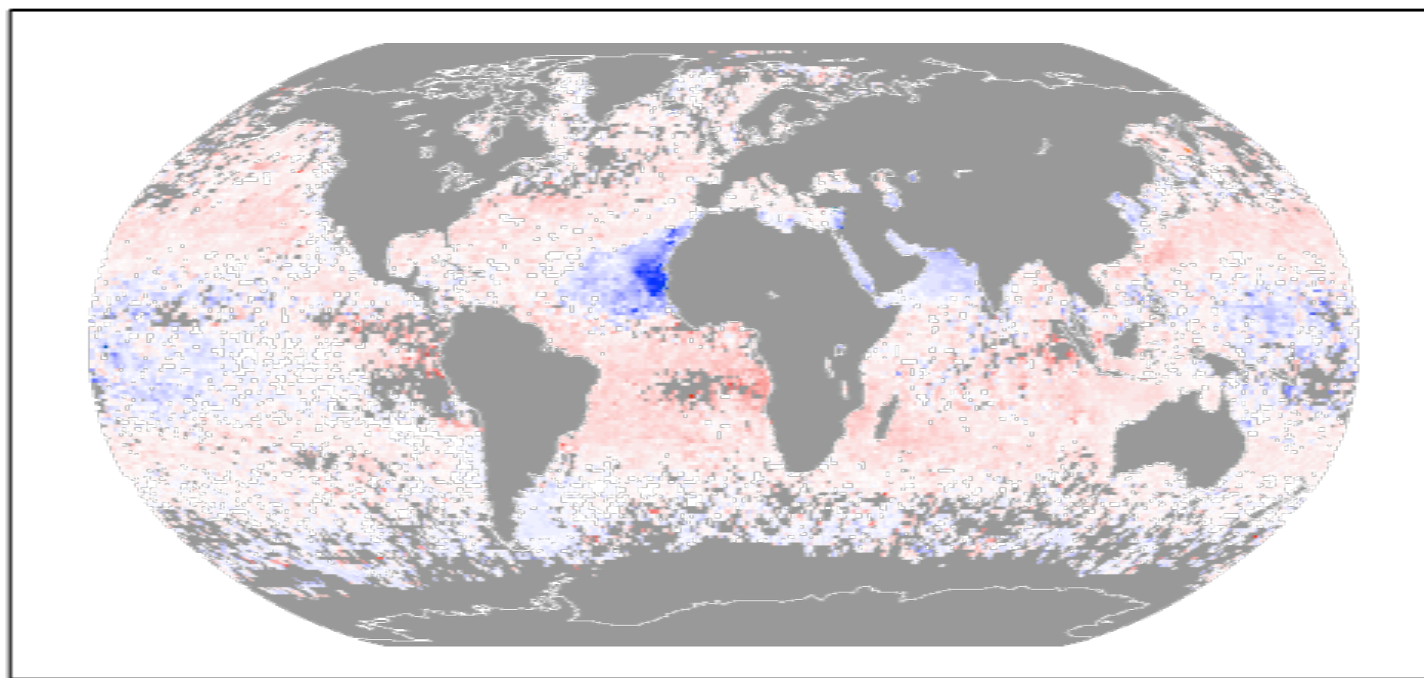
# Sept/2002 Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference



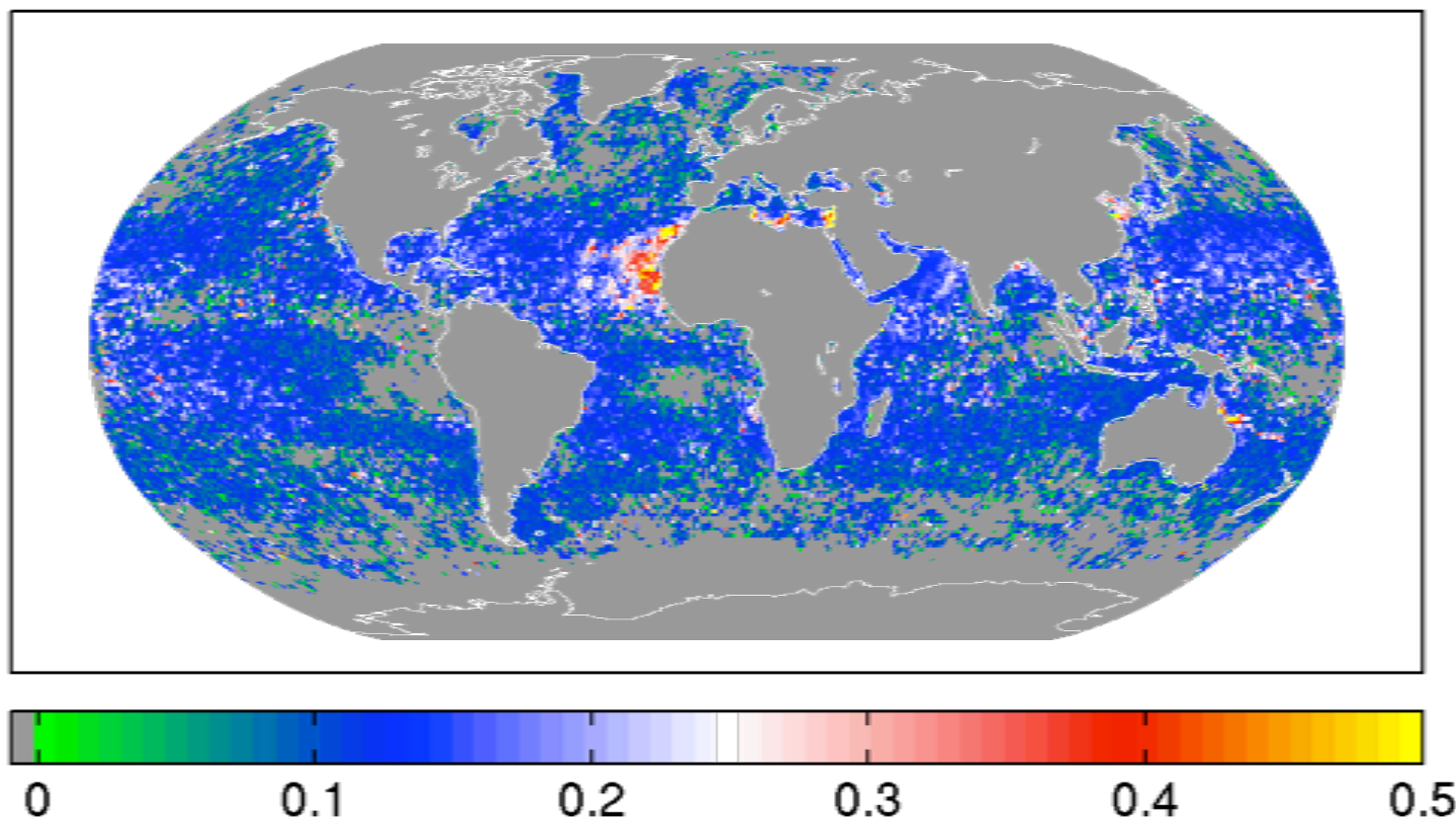
# Sept/2002 Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias STD



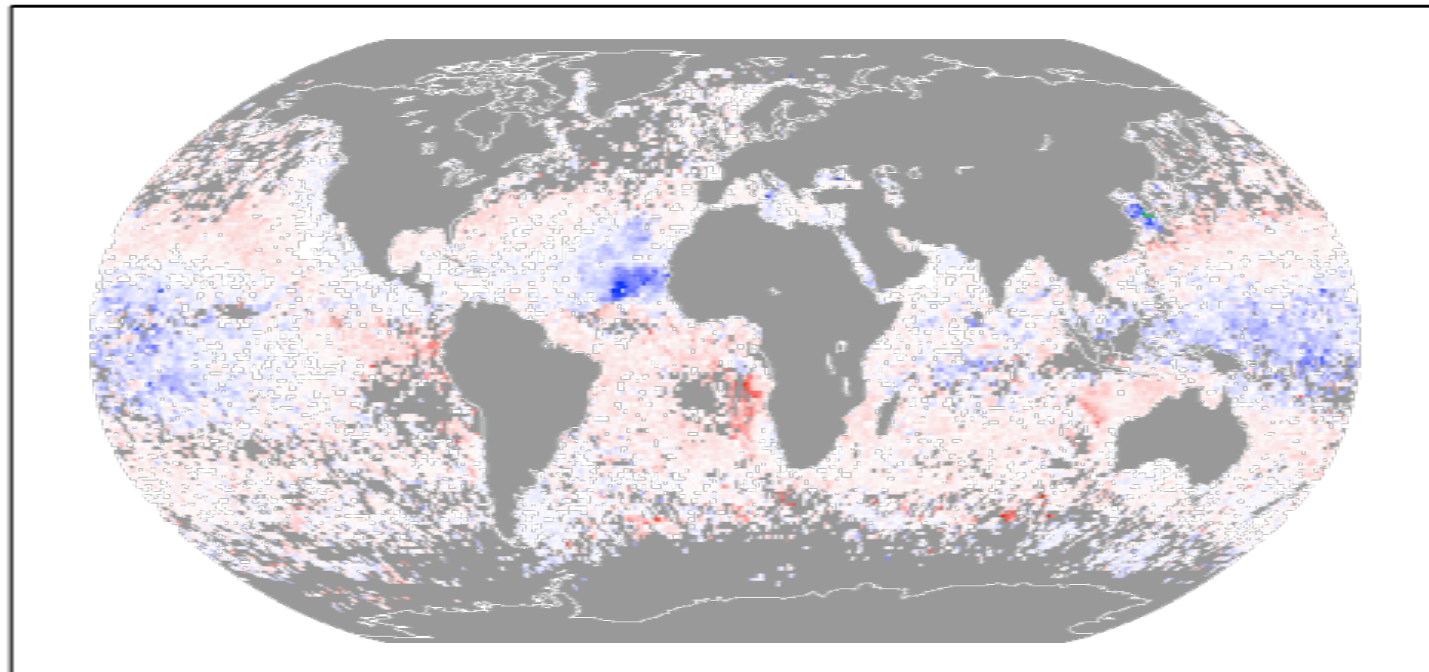
# Oct/2002 Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference



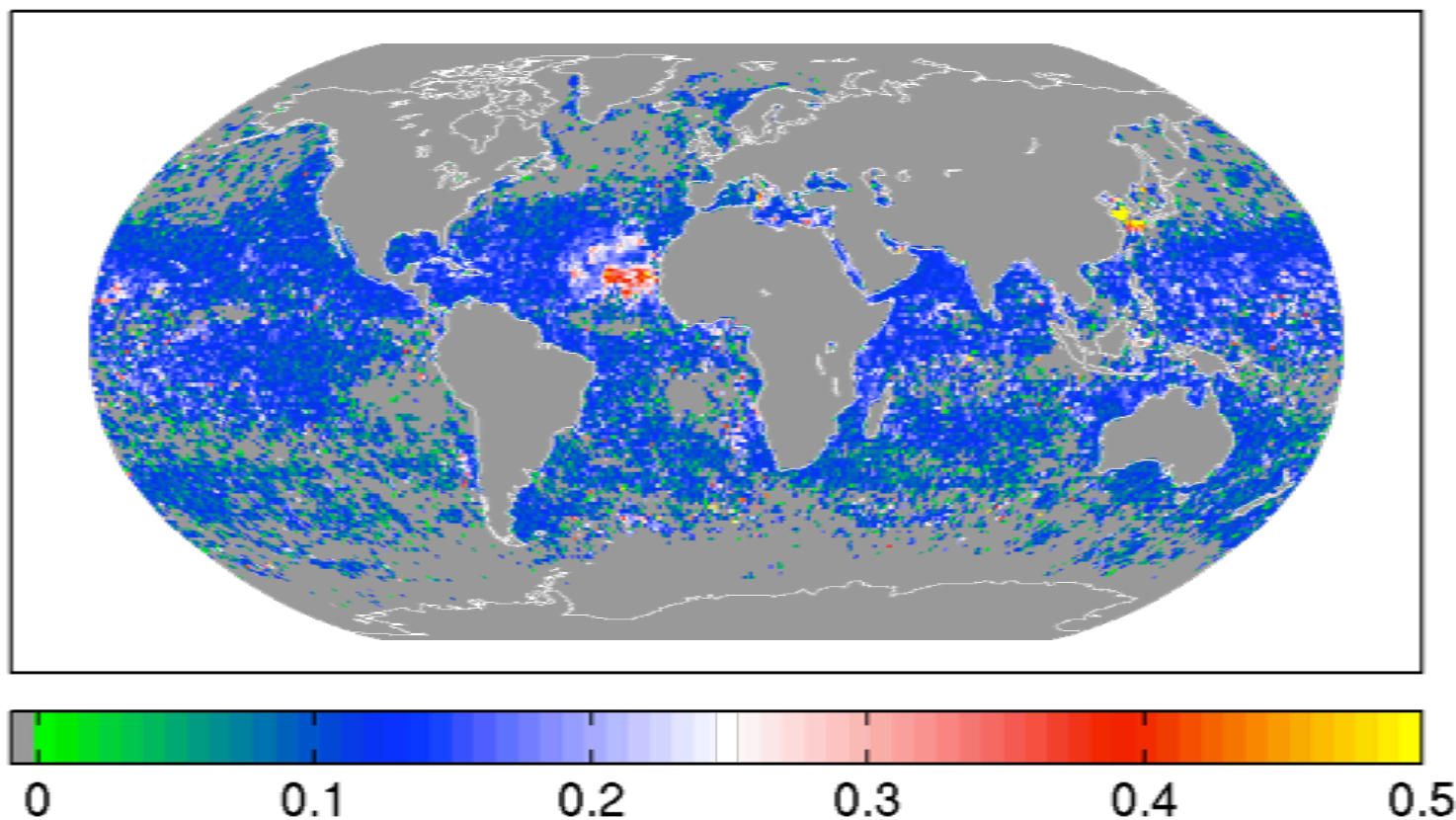
# Oct/2002 Dust Detection: 961 - 1232 cm<sup>-1</sup> Bias STD



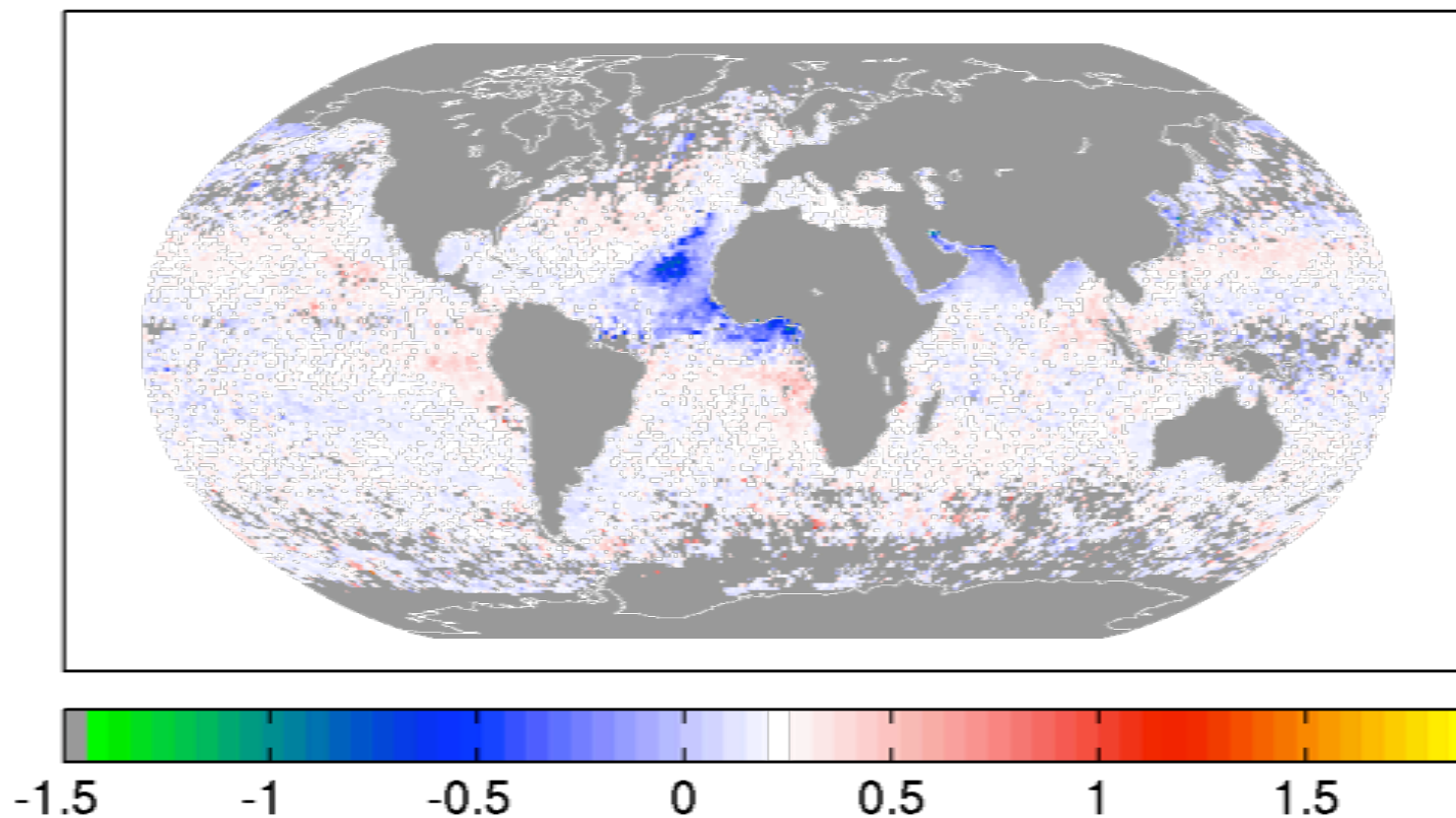
# Nov/2002 Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference



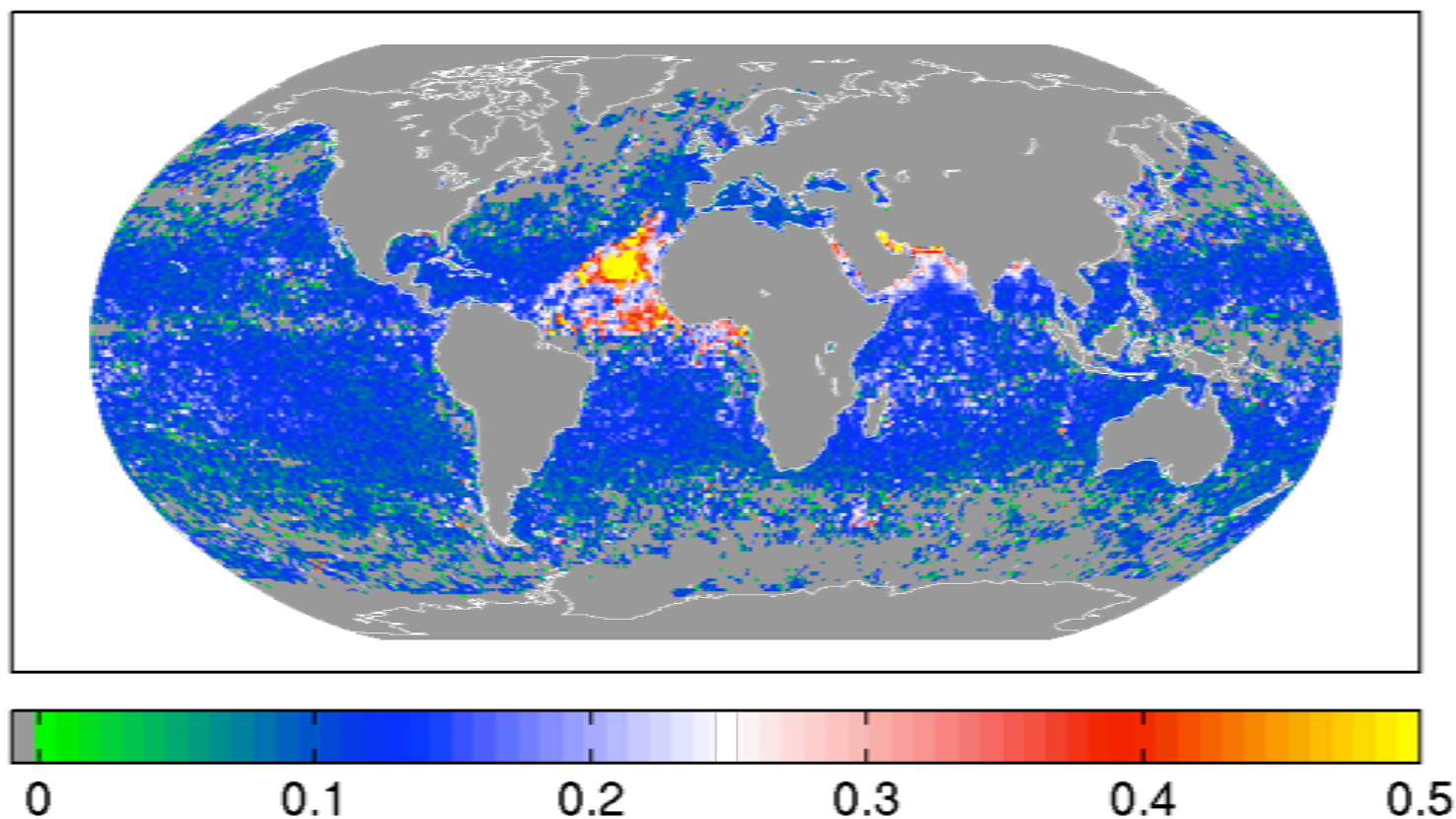
# Nov/2002 Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias STD



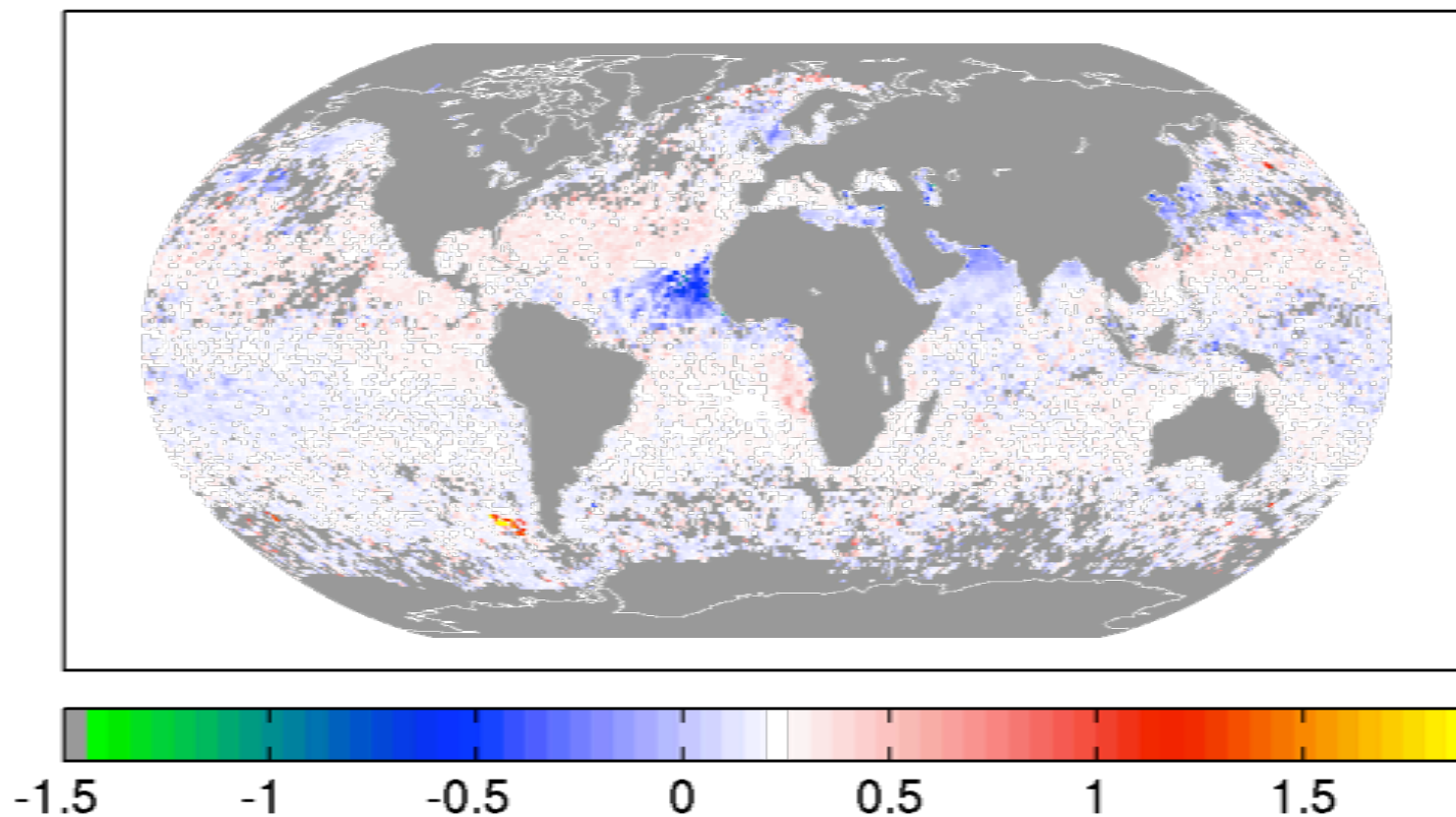
# March Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference



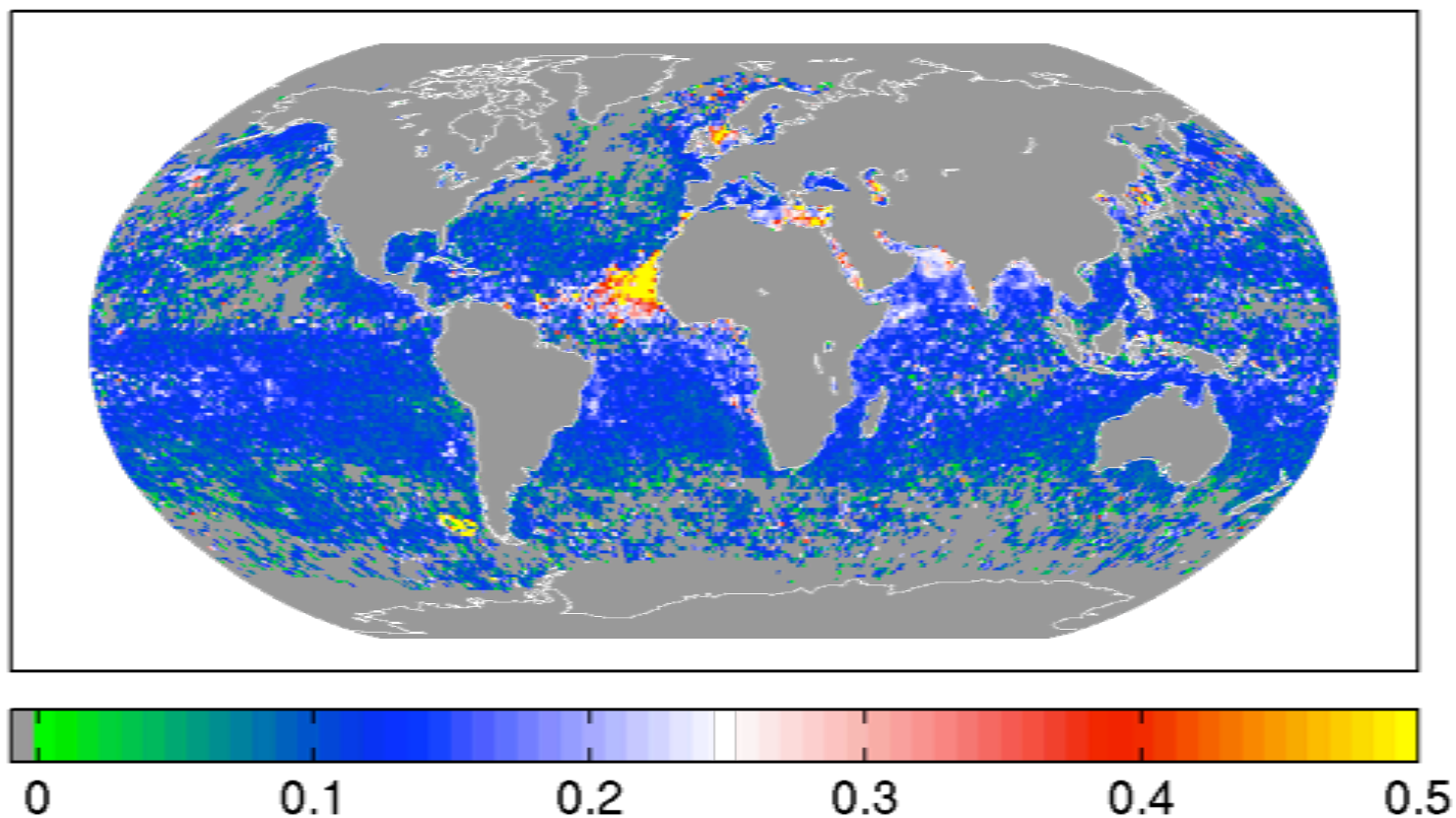
# March Dust Detection: 961 - 1232 cm<sup>-1</sup> Bias STD



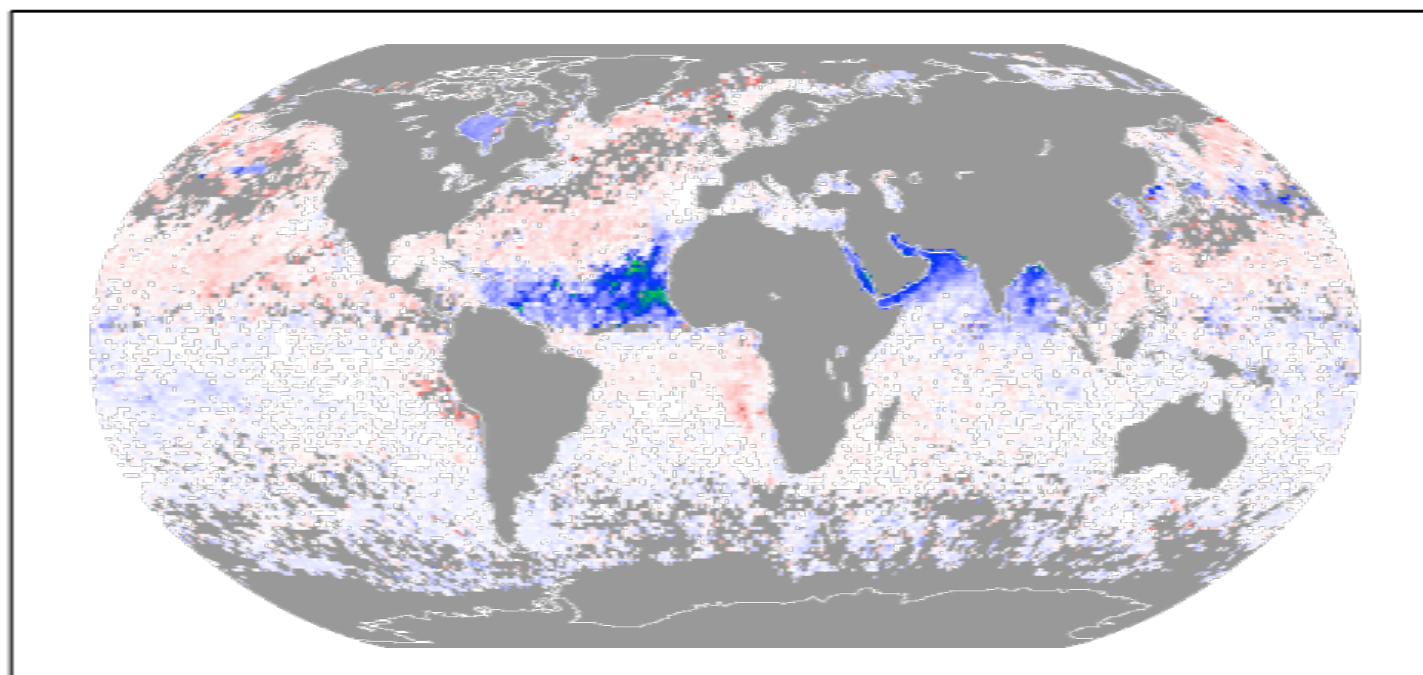
# April Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference



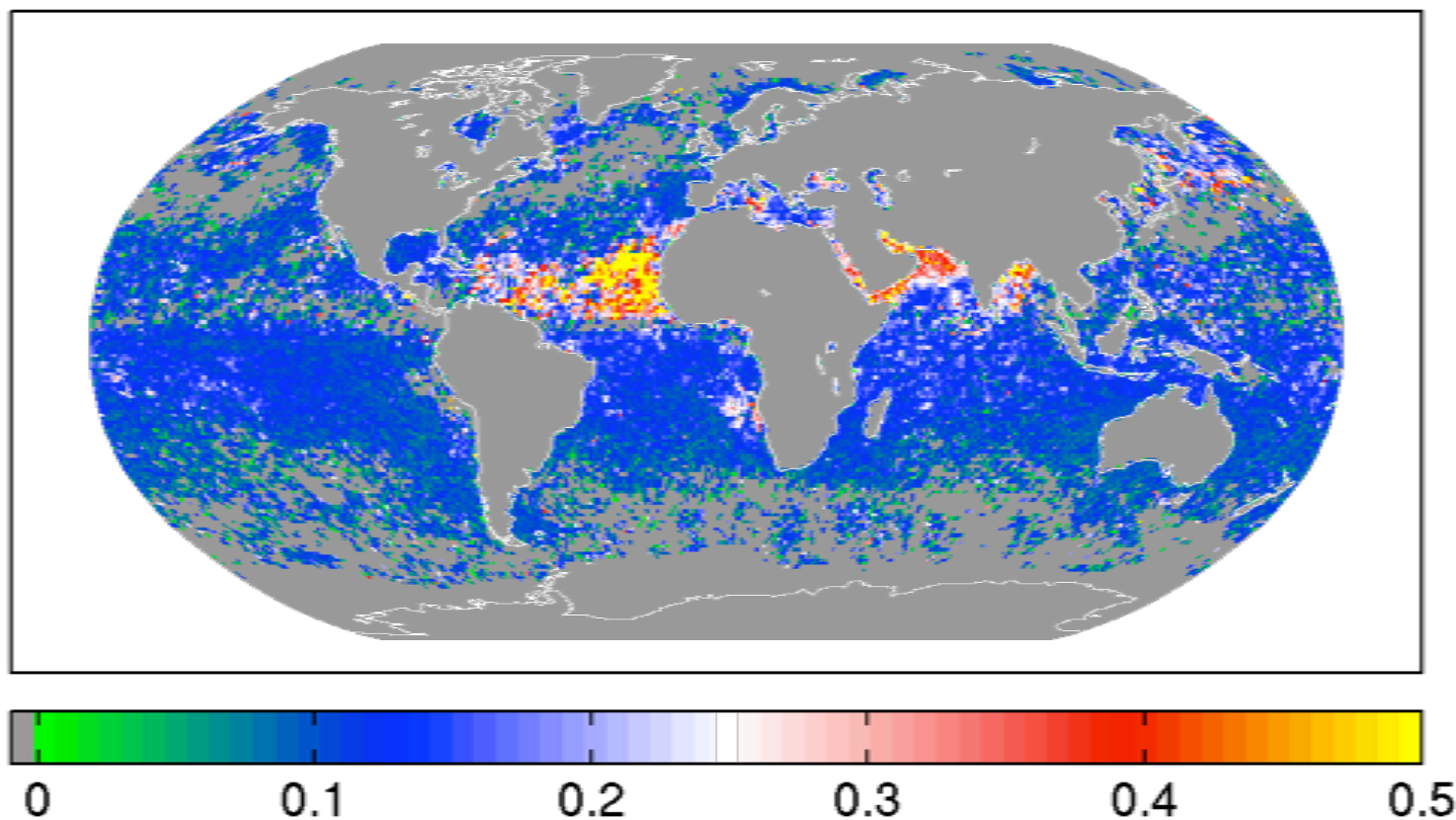
# April Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias STD



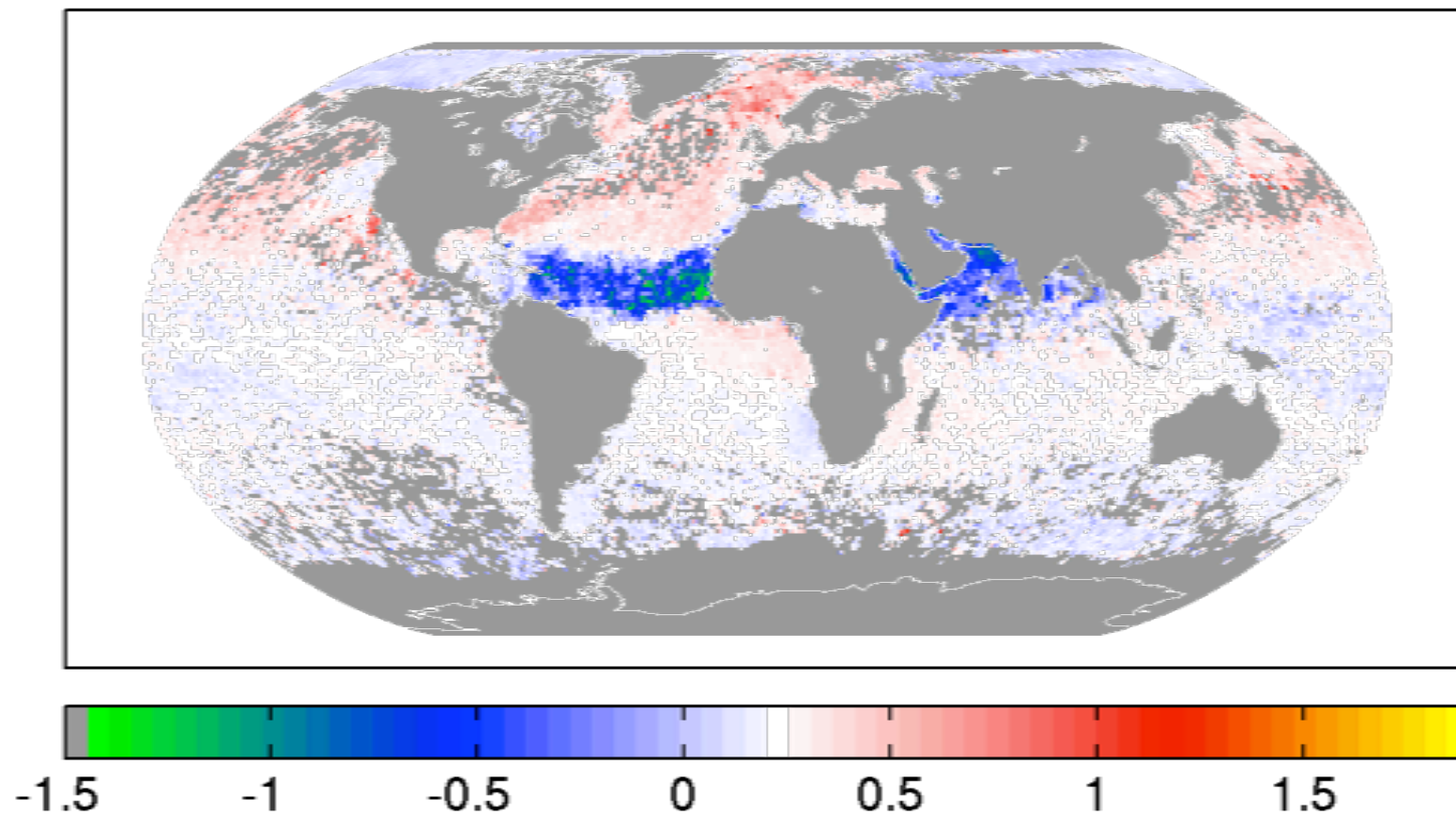
# May Dust Detection: 961 - 1232 cm<sup>-1</sup> Bias Difference



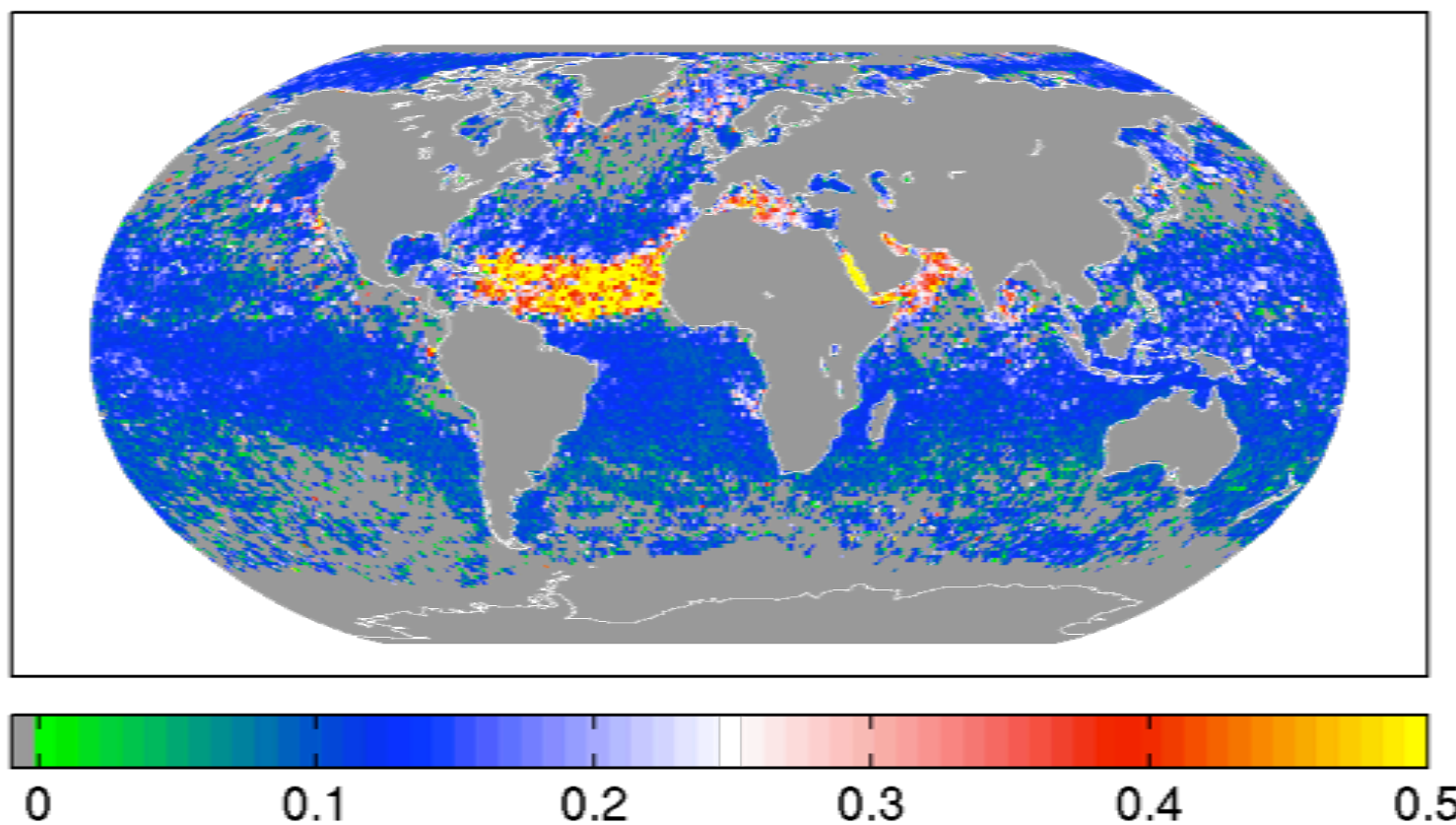
# May Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference STD



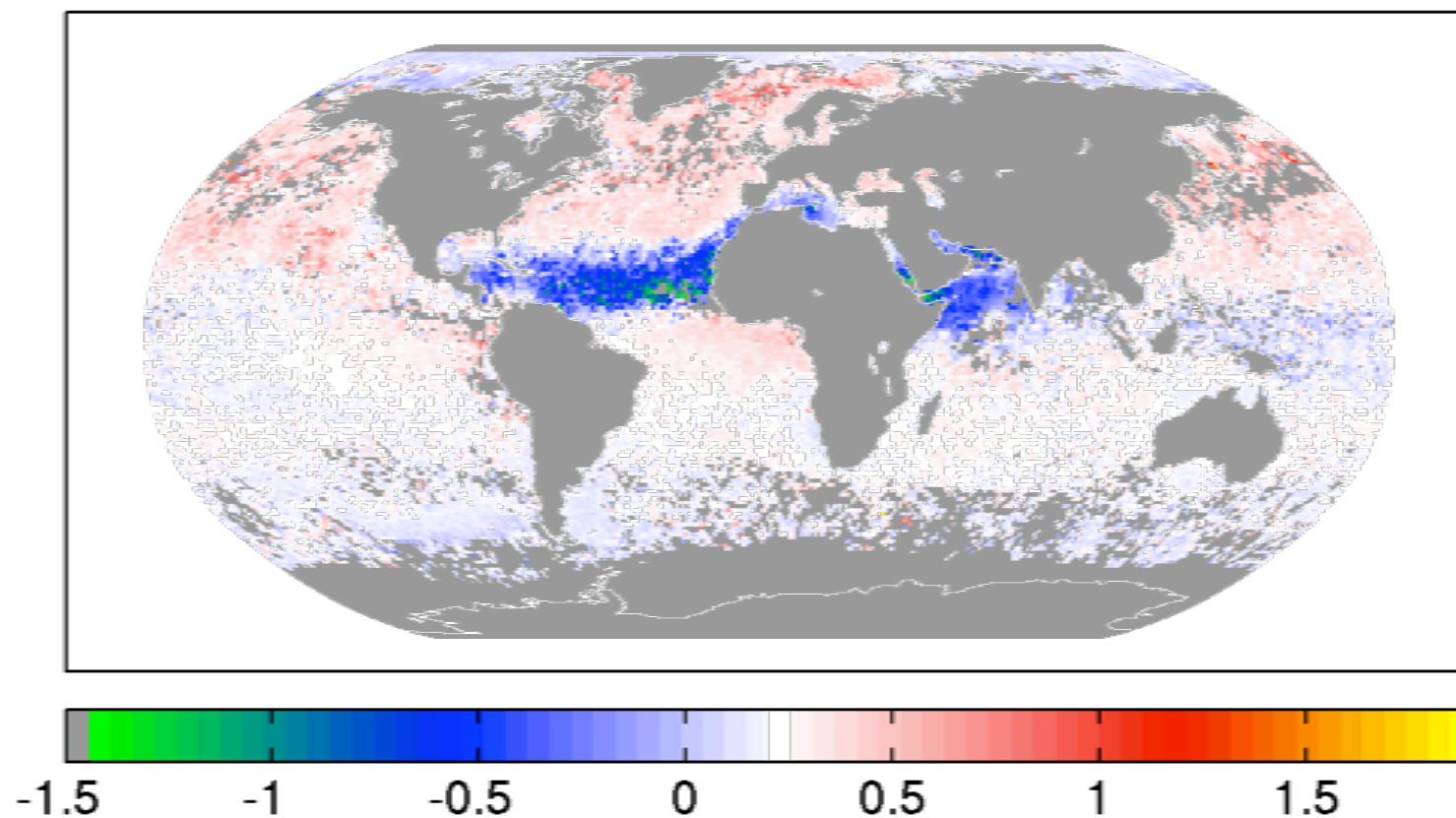
# June Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference



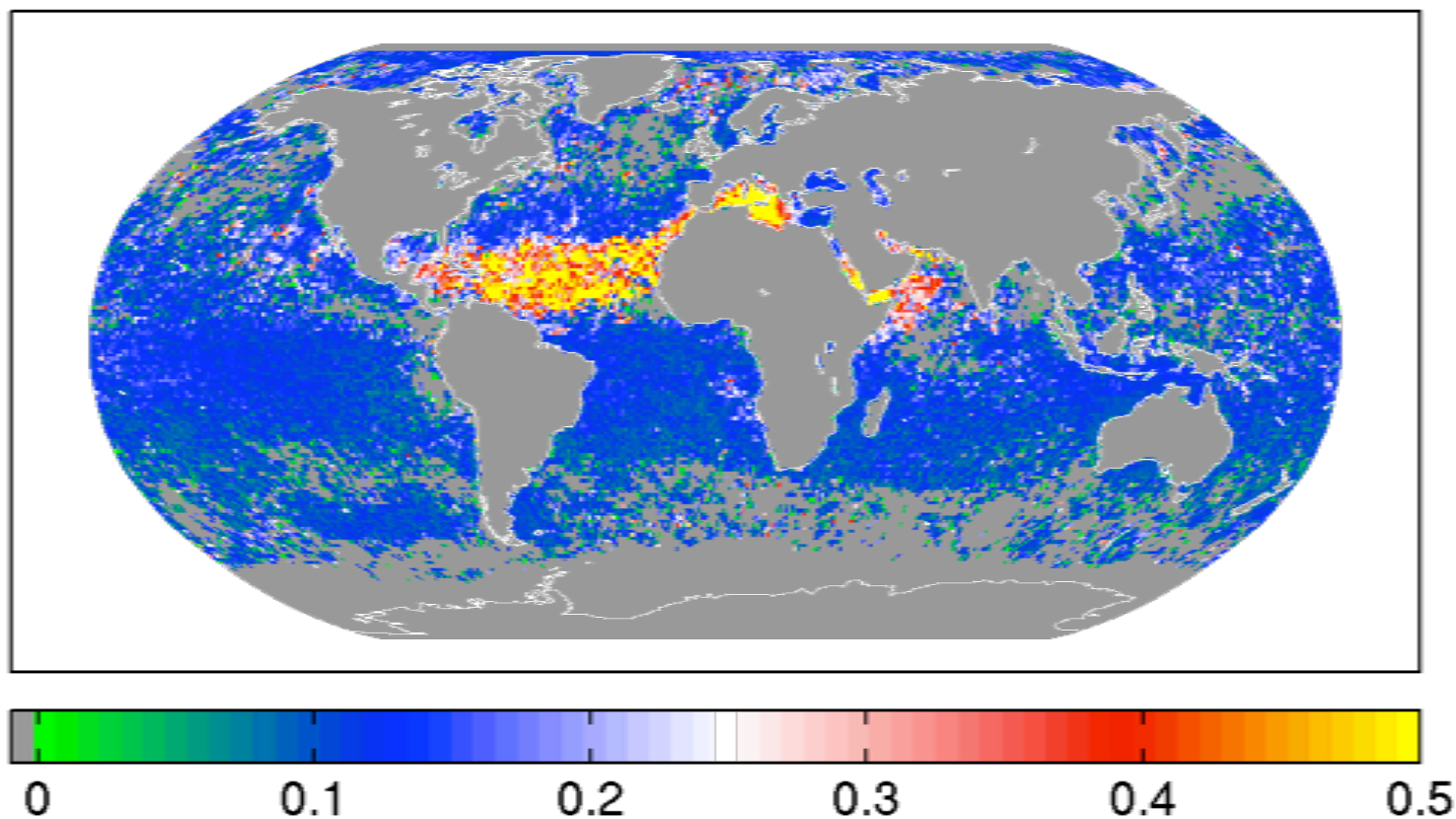
# June Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias STD



# July Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias Difference

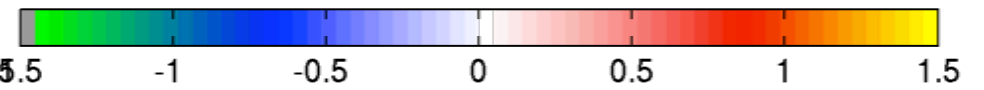
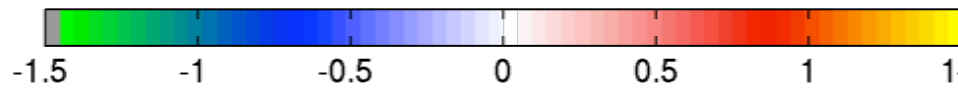
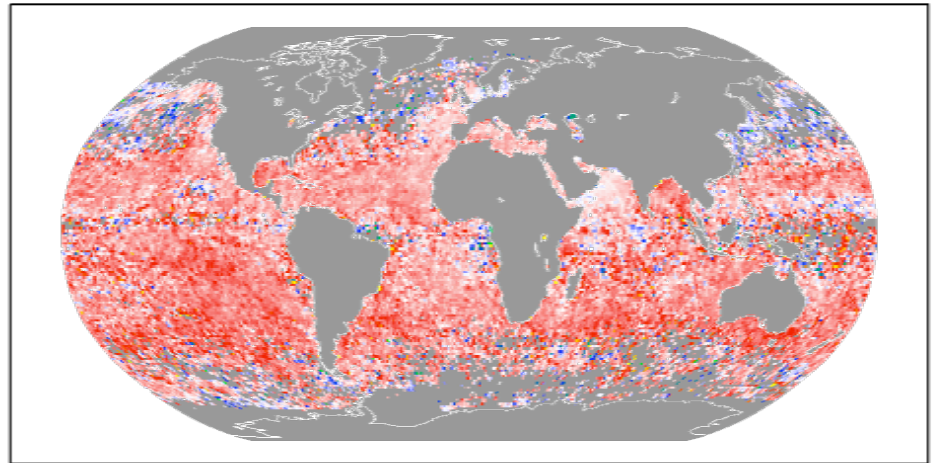
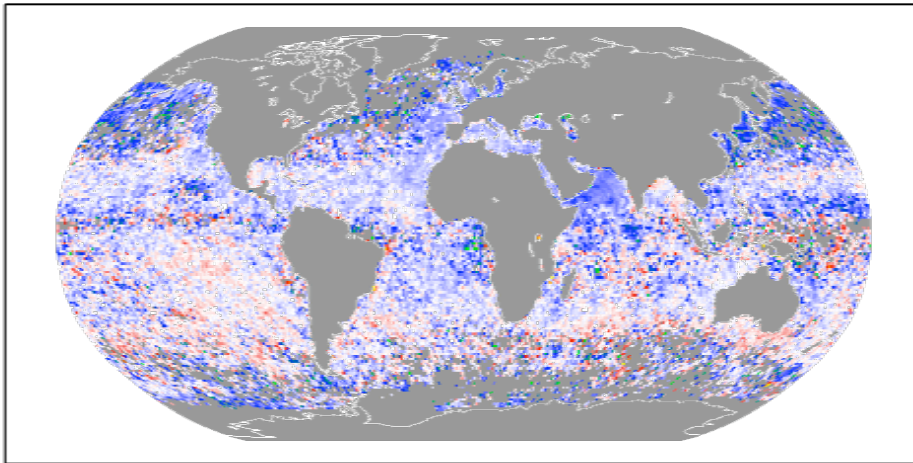


# July Dust Detection: 961 - 1232 $\text{cm}^{-1}$ Bias STD

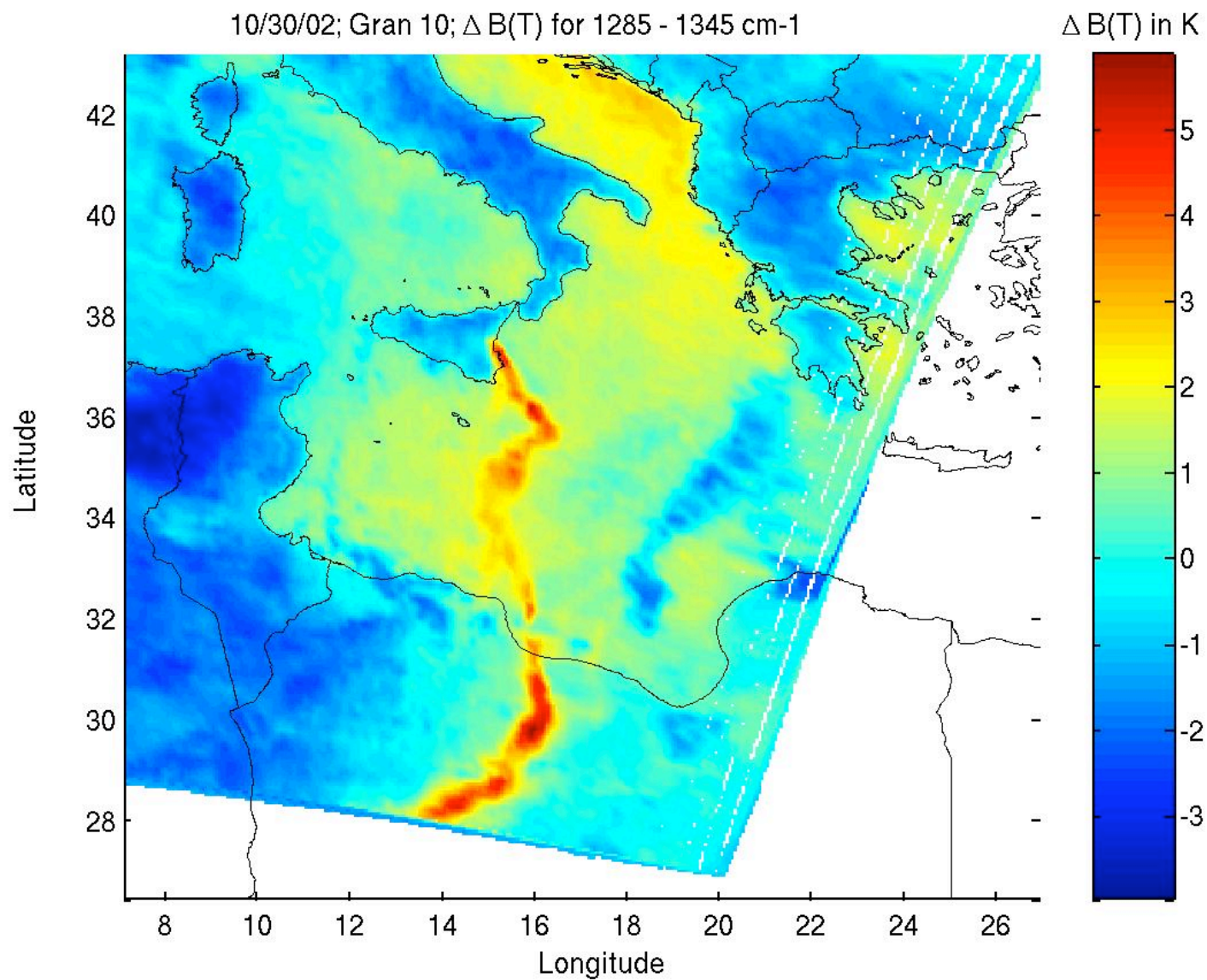


792 Bias, Con1, March 03, 370 ppm CO<sub>2</sub>

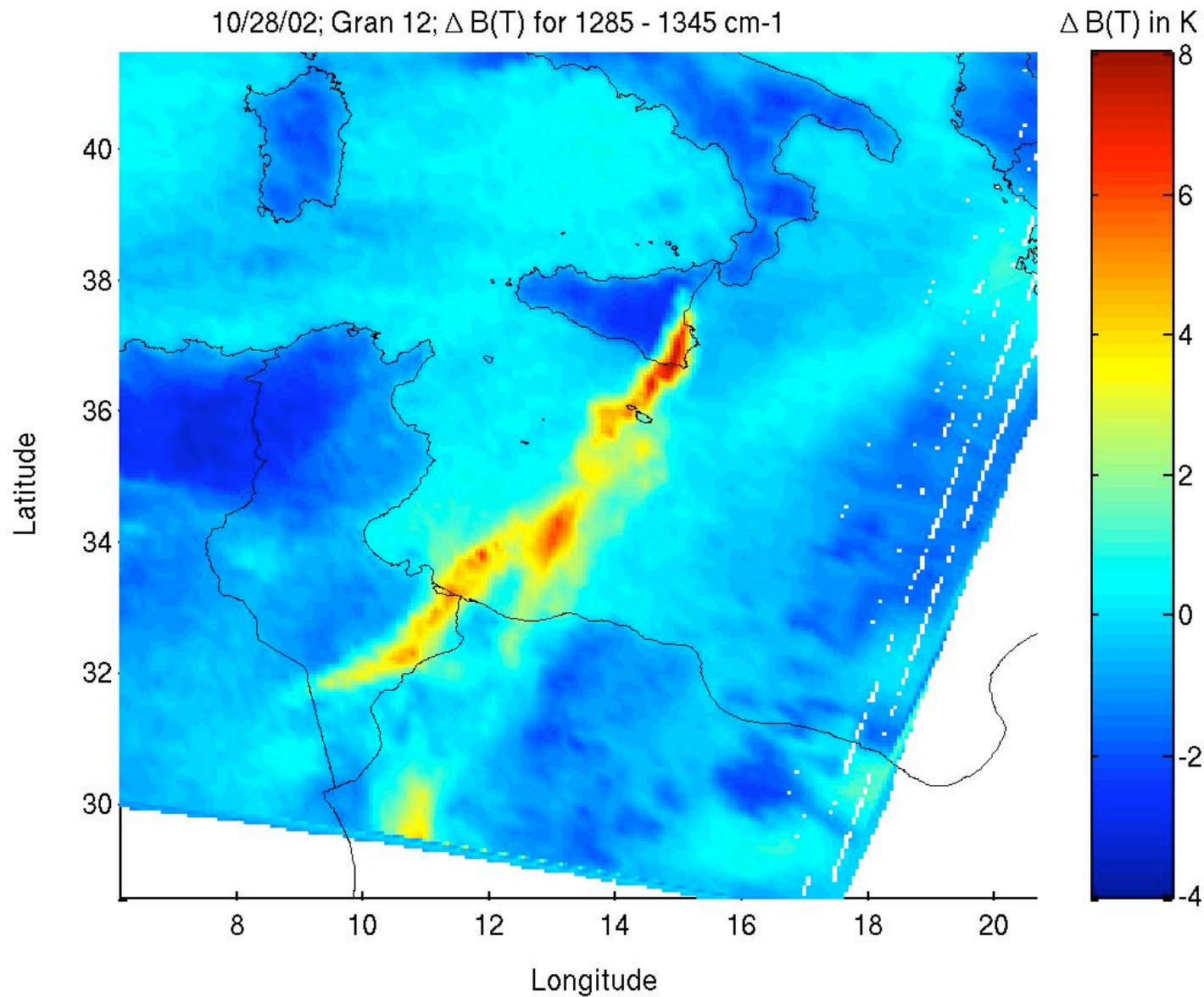
792 Bias, Con1, March 03, 385 ppm CO<sub>2</sub>



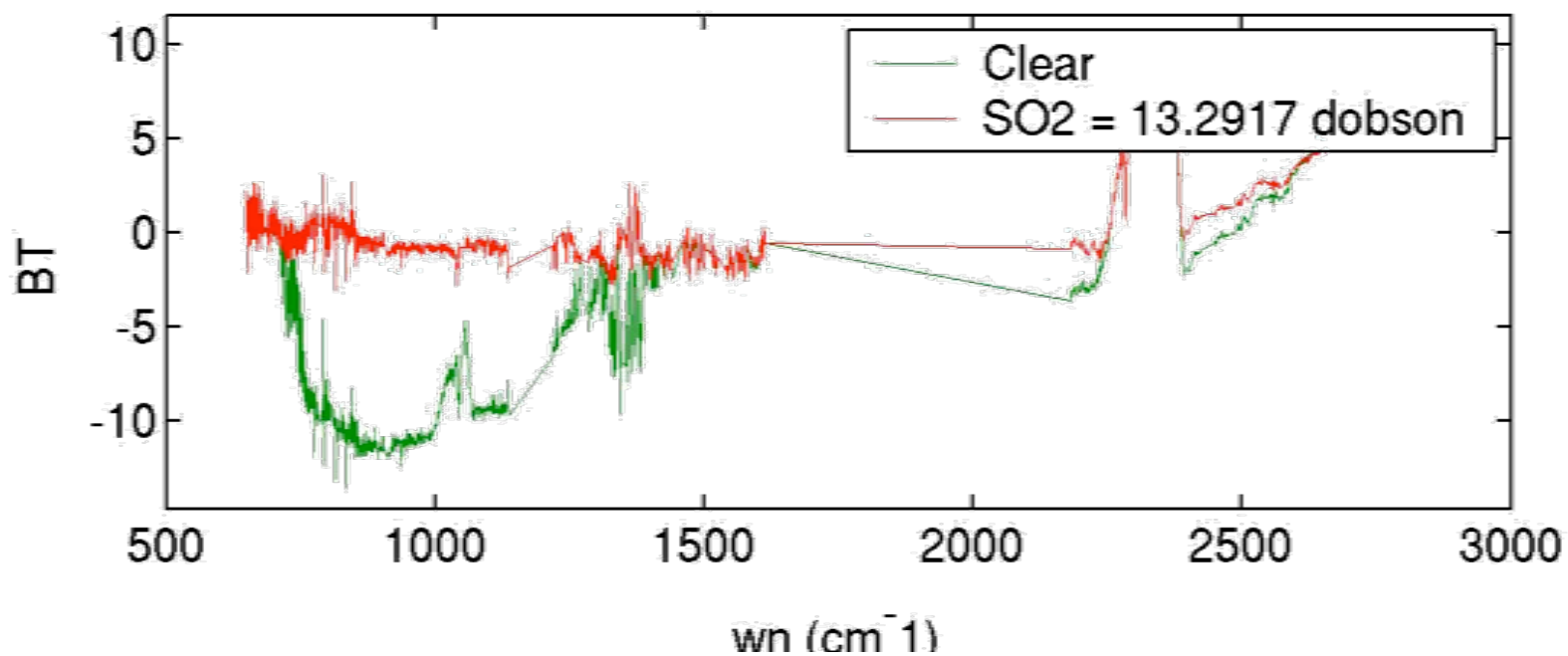
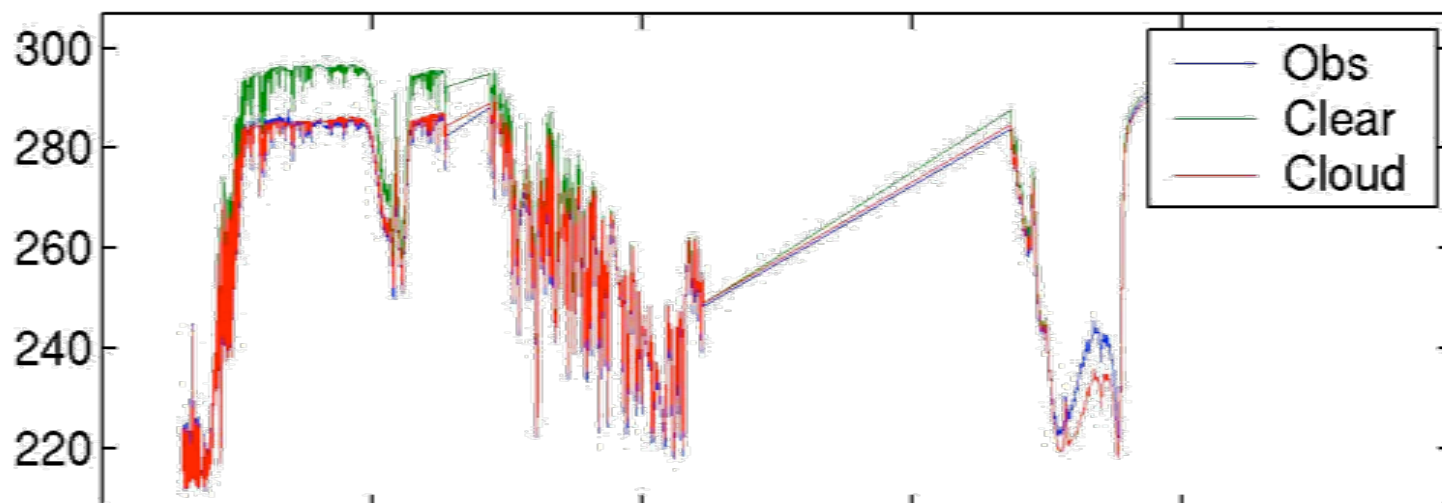
# Mt. Etna SO<sub>2</sub> Cloud from B(T) BIAS Differences



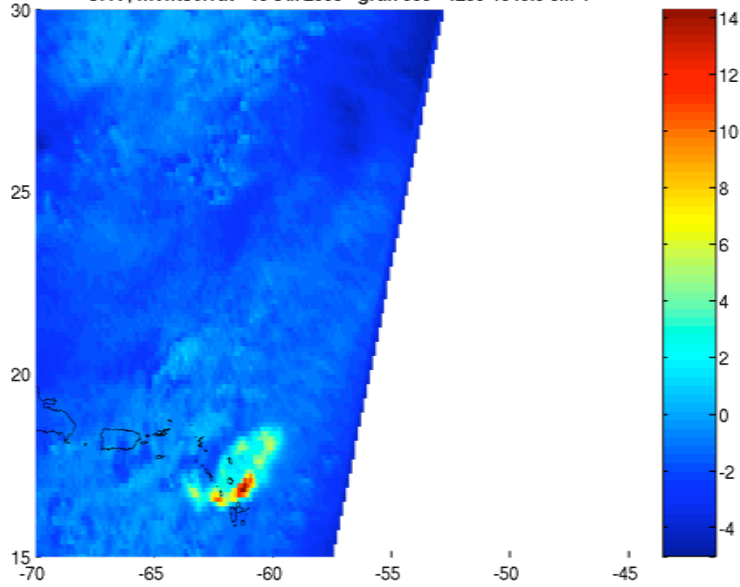
# Mt. Etna SO<sub>2</sub> Cloud from B(T) BIAS Differences



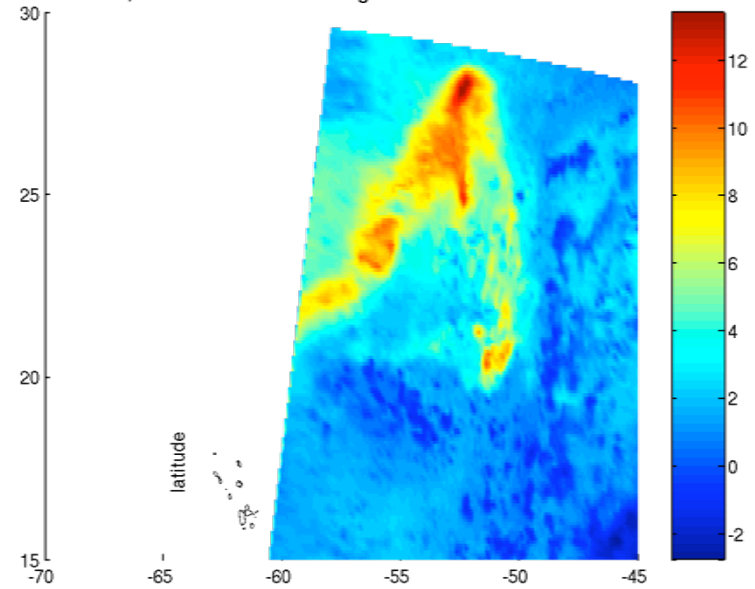
10/28/2002/gran123/prof2673



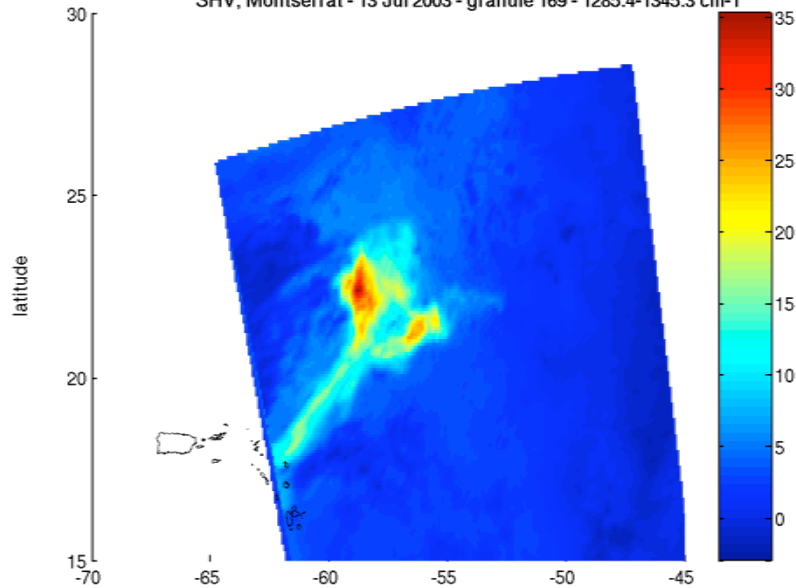
SHV, Montserrat - 13 Jul 2003 - gran 060 - 1286-1345.3 cm<sup>-1</sup>



SHV, Montserrat - 14 Jul 2003 - granule 51 - 1285-1345 cm<sup>-1</sup>



SHV, Montserrat - 13 Jul 2003 - granule 169 - 1285.4-1345.3 cm<sup>-1</sup>



Montserrat Eruption, Time  
Sequence

